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BEFORE THE ARIZONA CORPORATION COMMISSION

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IN THE MATTER OF THE APPLICATION OF
ARIZONA PUBLIC SERVICE COMPANY FOR
APPROVAL OF ITS DEMAND SIDE
MANAGEMENT PROGRAM PORTFOLIO
PLAN AND RELATED PROGRAMS

Docket No. E-01345A-05-

APPLICATION

E-01345A-05-0477

Arizona Public Service Company ("APS" or "Company") hereby submits this Application for approval of its Demand Side Management ("DSM") Portfolio Plan ("Portfolio Plan") and related programs. APS is seeking approval of all the proposed DSM programs, including the two proposed programs that have been previously submitted.¹

In April 2005, the Arizona Corporation Commission ("Commission") adopted a settlement agreement that obligates APS to spend at least \$48 million on approved eligible DSM-related items during the calendar years 2005-2007 (Decision No. 67744). In that Decision, the Commission adopted a Preliminary DSM Plan and ordered APS to submit a final DSM plan within 120 days. APS is submitting this Application well before that deadline to facilitate Commission approval and expedite program implementation.

¹ The Energy Wise Low Income Program was submitted on 6/6/05, Docket No. E-01345A-05-0414, and the Consumer Products program was submitted on 6/10/05, Docket No. E-01345A-05-0429. Detailed descriptions of all proposed programs, including those previously filed, are included in Exhibit A.

1 The DSM Portfolio Plan includes a balanced mix of programs that provide
2 opportunities for all customer classes to participate. The Portfolio Plan was created in
3 conjunction with a collaborative group of DSM experts and stakeholder representatives;
4 there were also opportunities for public input and comments. The proposed Portfolio Plan
5 provides estimated savings of 51.7 mW of peak demand and more than 3.4 million
6 lifetime mWh, as a result of program activities from 2005-2007. This results in estimated
7 total net benefits of approximately \$68 million and a benefit/cost ratio of 2.08, as
8 measured by the Societal Cost Test.
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11 BACKGROUND INFORMATION

12 The Preliminary Plan

13
14 A Preliminary Plan for eligible DSM-related items for calendar year 2005 was
15 adopted in Decision No. 67744.² The Preliminary Plan included \$6.9 million annually for
16 commercial, industrial and small business customer programs, including new
17 construction, and retrofitting of existing facilities. The Preliminary Plan also included
18 \$6.2 million annually for residential customers, including new construction, existing
19 homes and expanded funding for low income weatherization and bill assistance. Program
20 strategies to achieve energy-efficiency included training and education, design assistance,
21 financial incentives and other approaches to influence consumer energy-efficiency
22 decisions and practices. The Preliminary Plan also included an annual \$1.3 million for
23 measurement, evaluation and research and an annual \$1.6 million for performance
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28 ² See Decision No. 67744, Attachment A, Appendix B.

1 incentive, which is APS' share of DSM program net economic benefits, capped at 10
2 percent of total DSM expenditures. These components, which were adopted by the
3 Commission, have been incorporated into the proposed Portfolio Plan, as described in
4 detail below.
5

6 **The DSM Baseline Study**

7 To ensure that DSM funds would be spent prudently, APS filed for approval of a
8 DSM baseline study³ to assess the potential for improving the market penetration of
9 energy-efficient technologies and practices in residential and non-residential customer
10 segments. In Decision 67816, the Commission approved the expenditure of DSM funds
11 that had been designated for measurement, evaluation and research to be applied to this
12 market assessment study. This study will provide reliable information on the market
13 potential, kW and kWh savings potential and costs associated with energy-efficiency
14 technologies. The study information, expected before the end of 2005, will be used to
15 assist in the verification of program design assumptions during the roll-out of the initial
16 phase of the DSM programs and to target programs to maximize cost effectiveness.
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20 **The Process: Development of the Portfolio Plan**

21 As part of Decision No. 67744, APS was required to implement and maintain a
22 collaborative DSM working group (the "Collaborative") to solicit and facilitate
23 stakeholder input, advise APS on program implementation, develop future DSM programs
24 and review DSM program performance. The Collaborative, consisting of DSM experts
25 and stakeholder representatives, including members of Commission Staff, the Residential
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28 ³ Filed on March 11, 2005.

1 Utility Consumer's Office, the Southwest Energy Efficiency Project, Western Resource
2 Advocates, the Department of Commerce Energy Office, Arizonans for Electric Choice
3 and Competition and others, participated in the development of the proposed DSM
4 programs and resulting Portfolio Plan⁴.

6 APS also sought public input; the Company held public meetings during the
7 planning process to solicit public input and comment on the proposed Portfolio Plan.⁵

10 **PROPOSED DSM PORTFOLIO PLAN**

11 APS proposes to implement a portfolio of energy-efficiency DSM programs that
12 "will reduce the use of electricity by means of energy-efficiency products, services or
13 practices."⁶ The proposed programs are designed to influence consumers' decisions about
14 energy-efficiency products, services and practices through a combination of rebates and
15 incentives, technical assistance and training, and consumer education.

17 The proposed DSM Portfolio Plan is expected to produce long-term energy
18 consumption and demand savings. It is anticipated that over the expected lifetime of all
19 DSM measures, the Portfolio Plan will produce net benefits of approximately \$68 million
20 from measures implemented in the 2005-2007 timeframe. In addition, it is anticipated
21 that the Portfolio Plan will produce other societal benefits, such as water conservation, air
22 emissions reductions, increased consumer awareness about energy efficiency, as well as
23 weatherization and bill assistance for low-income households, including Native American
24

26 ⁴ APS has had a series of over 20 meetings and extensive correspondence with members of the Collaborative to
27 develop the Portfolio Plan and related programs.

28 ⁵ Public meetings were held on April 12, 2005 and June 17, 2005.

⁶ This is the definition for "energy efficiency" as stated in Decision No. 67744, Attachment A, paragraph 40.

1 households.

2 To communicate the benefits of the Portfolio Plan and the related programs to APS
3 customers, APS will work within existing markets whenever possible to take advantage of
4 natural opportunities to promote efficiency at the time that customers are making energy-
5 related purchasing decisions. This involves working closely with key market players and
6 contractors involved in new construction, renovations, and equipment replacement and
7 repair opportunities. The Portfolio Plan will also include targeted communications to
8 encourage participation among Native American tribes.
9

10
11 APS is proposing that programs be implemented using a mix of both in-house and
12 outsourced resources. This enables the Company to take advantage of outsourced experts
13 who have implemented similar programs in other areas, while also using internal
14 resources where appropriate to integrate the DSM programs into a wide range of customer
15 communications and outreach efforts. APS will be responsible for program
16 administration and reporting activities for all programs. APS intends to issue Requests for
17 Proposals to qualified firms for the significant activities that will be outsourced.
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21 **THE PROPOSED PROGRAMS**

22 The following is an overview of the proposed programs within the Portfolio Plan.
23 Specific, detailed program descriptions are attached to Exhibit A of this filing⁷.
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27 ⁷ Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval
28 date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports
submitted to Staff.

1 **RESIDENTIAL PROGRAMS:**

2 **"Energy Wise" Low Income Weatherization and Bill Assistance**

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4 The Energy Wise Program is an expansion and modification of the current
5 program, which has been in place since 1996. This program provides residential
6 customers with free measures to improve the energy-efficiency of their homes and is
7 available to all income-qualified⁸ residential customers in the APS service territory,
8 including those on tribal lands. The program includes funding for some energy-related
9 emergency repair and replacement and health/safety measures. The program also
10 provides for bill assistance to help pay electric bills for customers in crisis situations. APS
11 estimates that this program will produce savings of 0.5 mW of peak demand and 51,000
12 mWh over the expected lifetime of all program measures implemented from 2005-2007.
13 This program modification was filed on June 6, 2005, in Docket # E-01345A-05-0414 and
14 is pending Commission approval

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16
17 **Residential Existing Homes Air Conditioning Efficiency**

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19 This proposed program promotes a whole-system approach to improving the
20 performance of residential heating and air-conditioning systems, including high efficiency
21 equipment, quality installation, and repair and maintenance by qualified technicians. The
22 program includes incentives for high-efficiency Environmental Protection
23 Agency/Department of Energy ("EPA/DOE") Energy Star® approved air conditioning
24 equipment, quality installations, and system performance testing with energy efficiency
25 upgrades. This program will build on the current APS Qualified Contractor program,
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27
28 ⁸ To be income-qualified, the APS residential customer must have a household income of less than or equal to 150% of the federal poverty guidelines.

1 which provides referrals to contractors who meet rigorous program training requirements.
2 The program will also support training courses for heating, ventilation and air
3 conditioning ("HVAC") technicians and provide consumer education on the benefits of
4 high efficiency air conditioning systems. APS estimates that this program will produce
5 savings of 3.2 mW of peak demand and 133,000 mWh over the expected lifetime of all
6 program measures implemented from 2005-2007.
7

8 **Residential New Construction**

9
10 This proposed program promotes high-efficiency construction practices for new
11 homes. It is an expansion and modification of the current APS Performance Built Homes
12 program that has been in place since 2000. The program will promote newly constructed
13 homes that meet or exceed EPA/DOE Energy Star Home® performance requirements⁹.
14 To help offset incremental costs of high-efficiency construction and encourage
15 participation, the program offers incentives for builders who meet program standards.
16 The program also offers training and technical assistance for builders and subcontractors
17 and education for realtors and potential homebuyers about the benefits and features of
18 energy-efficient homes. APS estimates that this program will produce savings of 9.1 mW
19 of peak demand and 432,000 mWh over the expected lifetime of all program measures
20 implemented from 2005-2007.
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23 **Residential Consumer Products**

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25 This proposed program promotes high-efficiency EPA/DOE Energy Star®-
26 approved lighting and appliances (clothes washers, refrigerators and freezers, and
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28 ⁹ The program will be based on the more stringent 2006 Energy Star® standard.

1 dishwashers). The program will solicit discount pricing from compact fluorescent lamp
2 ("CFL") retailers and manufacturers and distribution of CFL's through local retailers.
3 Customers will be referred to participating retailers to purchase qualifying products at
4 discounted prices. The program provides sales training for participating retailers and
5 consumer education, including in-store point-of-sale displays. APS estimates that this
6 program will produce savings of 13.9 mW of peak demand and 499,000 mWh over the
7 expected lifetime of all program measures implemented from 2005-2007. This program
8 was filed on June 10, 2005; in Docket # E-01345A-05-0429 and is pending Commission
9 approval.
10
11

12 **NON-RESIDENTIAL PROGRAMS**

13 **Schools Program**

14
15 The Commission has emphasized the need to assist the state's public and charter
16 schools, directing that the implementation of DSM in schools is a top priority.¹⁰ APS is
17 proposing a program that is designed to provide assistance in reducing the energy used in
18 public school buildings, including charter schools. The Schools Program includes
19 financial incentives that will be paid to help schools afford the cost of energy-efficiency
20 upgrades. The Schools Program budget is reserved exclusively for school use. In
21 addition, if schools fully subscribe the School Program budget, they can participate in
22 other non-residential programs. All cost-effective energy-efficiency projects for schools
23 will be considered with an initial emphasis on upgrading lighting, design assistance,
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28 ¹⁰ Decision No. 67744 at 20.

1 building operator training, and energy education. APS estimates that this program will
2 produce savings of 2.8 mW of peak demand and 162,000 mWh over the expected lifetime
3 of all program measures implemented from 2005-2007.
4

5 **New Construction and Major Renovation**

6 This proposed program includes three components: design assistance, custom
7 efficiency and prescriptive measures. Design assistance involves efforts to integrate
8 energy-efficient improvements into a customer's design process to influence
9 equipment/systems selection and specification as early in the design process as possible.
10 Custom efficiency incentives provide the opportunity to implement energy-efficiency
11 measures not covered by prescriptive incentives for large non-residential customers and
12 provides for feasibility studies to assess the savings from complex applications. The
13 prescriptive measures specify the incentives provided to consumers for energy-efficiency
14 improvements in indoor lighting, HVAC, motor upgrades, and refrigeration measures.
15 APS estimates that this program will produce savings of 6.8 mW of peak demand and
16 735,000 mWh over the expected lifetime of all program measures implemented from
17 2005-2007.
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21 **Non-Residential Existing Facilities**

22 This proposed program provides prescriptive incentives to owners and operators of
23 large non-residential facilities for energy-efficiency improvements in lighting, HVAC,
24 motors, and refrigeration measures. The program will provide custom incentives for the
25 implementation of energy-efficiency measures that are not specifically covered in the
26 prescriptive incentives. In addition, the program will subsidize the cost of retro-
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28

1 commissioning projects to systematically optimize the operation of existing buildings.
2 The program also provides training and technical assistance for commercial contractors
3 and education for facility owners and operators. APS estimates that this program will
4 produce savings of 8.4 mW of peak demand and 768,000 mWh over the expected lifetime
5 of all program measures implemented from 2005-2007.
6

7 **Small Non-Residential DSM Program**

8 This proposed program provides prescriptive incentives to small non-residential
9 customers for energy-efficiency improvements in lighting, HVAC, motors, and
10 refrigeration applications through a simple and straightforward program participation
11 mechanism. The program supports "one-source" energy audits and the installation of
12 energy-efficiency equipment to make the process simple for small non-residential
13 customers. The program also includes training for contractors and promotion of
14 commercial qualified contractors. Educational materials are provided to assist building
15 owners and operators in making decisions to improve the energy efficiency of their
16 facilities. APS estimates that this program will produce savings of 6.3 mW of peak
17 demand and 540,000 mWh over the expected lifetime of all program measures
18 implemented from 2005-2007.
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22 **Building Operator Training Program**

23 This proposed program is designed to help building operators and facility
24 maintenance personnel better understand how their facilities use energy and how to better
25 manage energy costs and provides subsidized training for building operators and facility
26 maintenance technicians on energy-efficient building operating and maintenance
27
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1 practices. Participants learn the benefits of purchasing high-efficiency equipment, as well
2 as proper equipment operation and maintenance practices to improve efficiency. APS
3 estimates that this program will produce savings of 0.6 mW of peak demand and 74,000
4 mWh over the expected lifetime of all program measures implemented from 2005-2007.
5

6 **Energy Information Services Program**

7 This proposed program provides a web-based energy information tool, which
8 includes real time (or near real time) feedback on customer energy consumption and load
9 profiles. Large facility energy managers will receive tools to graphically analyze
10 consumption trends, compare multiple facilities, benchmark their performance, and track
11 their energy-efficiency efforts. The program supports the cost of providing the energy
12 information service and offers the service at a reduced price to large non-residential
13 customers. APS estimates that this program will produce savings of 0.3 mW of peak
14 demand and 41,000 mWh over the expected lifetime of all program measures
15 implemented from 2005-2007.
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20 **PERFORMANCE INCENTIVE**

21 Decision No. 67744 provides for a performance incentive for APS, which is based
22 on a share of net economic benefits from the energy-efficiency DSM programs¹¹. For the
23 years 2005 through 2007, the performance incentive will be capped at \$4.8 million, which
24 is 10% of the total amount of DSM spending (inclusive of the performance incentive)
25 ordered in Decision No. 67744.
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28 ¹¹ See Decision No. 67744 at 20.

1 **Conclusion**

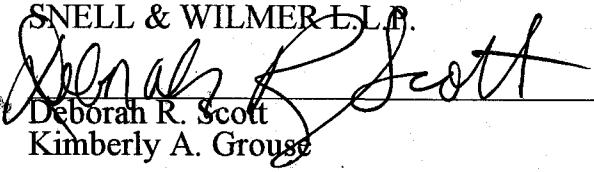
2 This DSM Program Portfolio Plan provides a variety of DSM programs that APS
3 proposes to implement to meet the requirements of Decision No. 67744, while providing
4 savings and net benefits for APS customers. APS requests that the Commission
5 expeditiously approve the proposed DSM Portfolio Plan so that consumers may begin to
6 benefit from the programs.
7

8 THEREFORE, APS respectfully requests that the Commission:
9

- 10 • Approve the DSM Program Portfolio Plan;
- 11 • Approve all of the related programs set forth in this Application;
- 12 • Approve any pending DSM program applications that have been
13 previously filed with the Commission to the extent no action is taken
14 prior to this matter; and
- 15 • Approve the Performance Incentive that was authorized by Decision No.
16 67744.
17

18 Respectfully submitted this 15th day of July, 2005.
19

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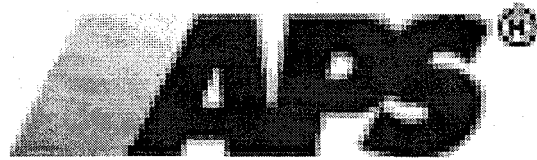
1 **ORIGINAL and 13 copies of the foregoing**
2 filed this 5th day of July 2005, with:

3 Docket Control
4 Arizona Corporation Commission
5 1200 West Washington
6 Phoenix, AZ 85007

7 Participants in the ACC DSM Workshops

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9 Vicki L. DiCola
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APS
Demand Side Management
Program Portfolio Plan
2005-2007

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Attachments:

APS Residential New Construction Program	Attachment 1
Residential Existing Homes HVAC Efficiency Program	Attachment 2
High Efficiency Consumer Products Program	Attachment 3
APS Energy Wise Low Income Weatherization Program	Attachment 4
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I. Introduction

On April 7, 2005, the Arizona Corporation Commission ("ACC") approved the Arizona Public Service Company ("APS" or "Company") rate settlement agreement in Decision No. 67744. As part of the settlement, APS is committed to significantly increase Demand Side Management ("DSM") program activity and spend an average of \$16 million annually from 2005-2007 on approved DSM programs.

Decision No. 67744 further directs that APS will, with input and assistance from the DSM collaborative working group, submit a final plan for Commission approval that outlines proposed DSM programs that the Company intends to implement. This proposed DSM Program Portfolio Plan ("Portfolio Plan") provides an overview of DSM programs that APS proposes to implement to meet the requirements of the settlement agreement while providing savings and net benefits for APS customers.

As part of its Decision No. 67744, the ACC required APS to implement and maintain a collaborative DSM working group to solicit and facilitate stakeholder input, advise APS on program implementation, develop future DSM programs, and review DSM program performance. The Portfolio Plan was developed in conjunction with this collaborative group of DSM experts and stakeholder representatives, including members of ACC staff, the Residential Utility Consumer's Office ("RUCO"), the Southwest Energy Efficiency Project ("SWEEP"), Western Resource Advocates ("WRA"), the Department of Commerce Energy Office ("the Energy Office"), Arizonans for Electric Choice and Competition ("AECC") and others. APS also sought public input; the Company held public meetings during the planning process to solicit public input and comment on the proposed plan.

II. DSM Portfolio Performance: Costs, Savings and Net Benefits

APS proposes to implement a portfolio of energy-efficiency DSM programs “that reduce the use of electricity by means of energy-efficiency products, services or practices” (Decision No. 67744, Attachment A, paragraph 40). Demand response may be considered for future DSM programs.

The proposed programs are designed to influence energy decisions by residential and non-residential customers and other market players through a combination of rebates and incentives, technical assistance and training, and consumer education.

The proposed DSM program portfolio is expected to produce long-term energy consumption and demand savings. The following table summarizes the expected energy and demand savings and total program net benefits as a result of program activities from 2005-2007.

Exhibit 1
DSM Portfolio Estimated Performance 2005-2007

Program Budget 2005-2007	Lifetime MWh Savings*	Peak Demand Savings (MW)	Total Net Benefits*
\$48 Million	3,435,000	51.7	\$68 Million

*Refers to savings and total net benefits over the expected lifetime of all program measures. Total Net Benefits are equal to Total Societal Benefits minus Total Societal Costs. Total Societal Costs include all program costs including the cost of Measurement, Evaluation & Research and the Performance Incentives.

The total societal cost per lifetime kWh estimated to be saved is approximately \$0.018. **In summary, for every one dollar invested in DSM within the APS territory, society will realize \$2.08 of total benefits.**

III. Description of Programs to be Undertaken

The program portfolio includes a balanced mix of programs to address a diversity of APS customer segments so that all customer classes and segments have an opportunity to benefit from at least one DSM program. Market opportunities include: residential existing homes, residential new construction, consumer products (appliances and lighting), non-residential existing buildings, non-residential new construction and renovation, and small business. In addition, the portfolio provides special programming and funding to help schools, Native Americans, and low-income residential customers save on energy costs.

The portfolio is consistent with the preliminary list of programs and strategies that was included in the Preliminary Energy-Efficiency DSM Plan (Decision No. 67744 Attachment A, Appendix B). Exhibit 2 on pages 10 and 11 shows the list of programs from Appendix B and makes a comparison to the APS proposed final Portfolio Plan, including a description of minor modifications that were made during the program development process in conjunction with the DSM collaborative group.

This section includes a brief description of each proposed DSM program. Detailed program descriptions are provided in the Attachments including information about program concepts, target markets, baseline conditions, customer eligibility, program rationales, program objectives, products and services provided, delivery strategy and administration, marketing and communications, implementation schedules, monitoring and evaluation plans, program costs, estimated energy savings, and program cost effectiveness. The DSM programs include:

Residential	Non-Residential
Consumer Products	Schools
Existing Home HVAC	Small Business
New Construction	Large Existing
Low Income	Large New Construction
	Building Operator Training
	Energy Information Services

Residential Programs

Residential New Construction

This proposed program promotes high-efficiency construction practices for new homes. It is an expansion and modification of the current APS Performance Built Homes program that has been in place since 2000. The program will promote homes that meet or exceed Environmental Protection Agency/Department of Energy ("EPA/DOE") Energy Star Home® performance requirements (the program will be based on the more stringent 2006 Energy Star® standard). To encourage participation, the program offers incentives for builders who meet program standards. The program also offers training and technical assistance for builders and subcontractors as well as education for realtors and potential homebuyers about the benefits and features of energy efficient homes. For a detailed program description, see Attachment 1.

Residential Existing Homes Air Conditioning Efficiency

This proposed program promotes a whole-system approach to improving the performance of residential heating and air-conditioning systems including high efficiency equipment, quality installation, and repair and maintenance by qualified technicians. The program includes incentives for high-efficiency EPA/DOE Energy Star® approved air conditioning equipment, quality installations, and system performance testing with energy-efficiency upgrades. This program will build on the current APS Qualified Contractor program (that has been in place since 1998), which provides referrals to contractors who meet rigorous program training requirements. The program will also support training courses for heating, ventilating and air conditioning ("HVAC") contractor technicians and provide consumer education on the benefits of high efficiency heating and air conditioning systems. For a detailed program description, see Attachment 2.

Residential Consumer Products

This proposed program promotes high-efficiency EPA/DOE Energy Star® approved lighting and appliances (clothes washers, refrigerators, freezers, and dishwashers). The program will solicit discount pricing from Compact Fluorescent Lamps ("CFL") manufacturers and retailers (up-stream buy-down) and distribution of CFL's through local retailers. Customers will be referred to participating retailers to purchase qualifying products. Discount pricing will be passed on to consumers through a negotiated agreement with lighting manufacturers and retailers. The program provides sales training for participating retailers and consumer education, including in-store point-of-sale displays. This program was filed with the ACC for approval on June 10, 2005, Docket No. E-01345A-05-0429. For a detailed program description, see Attachment 3.

Residential "Energy Wise" Low Income Weatherization

This proposed program is an expansion and modification of the current program which has been in place since 1996. The program provides qualifying low income residential customers with free measures to improve the energy-efficiency of their homes. The program includes funding for some energy related emergency repair and replacement and health/safety measures. The program also provides bill assistance to help pay electric bills for customers in crisis situations. Native American customers living on tribal lands have a specific budget for their weatherization and bill assistance needs. This program modification was filed with the ACC for approval on June 6, 2005, Docket No. E-01345A-05-0414. For a detailed program description, see Attachment 4.

Non-Residential Programs

Schools

This proposed program is designed to provide assistance in reducing the energy used in public school buildings, including charter schools. The program includes financial incentives that will be paid to help schools afford the cost of energy-efficiency upgrades. This program budget is reserved exclusively for school use. If schools fully subscribe this program budget, they can participate in other non-residential programs. All cost-effective energy-efficiency projects for schools will be considered with an initial emphasis on upgrading lighting plus providing design assistance, building operator training, and energy education. Lighting consumes 30% of the electricity used by schools. Installing energy efficient lights can reduce lighting costs by up to 30%, resulting in a reduction of up to 9% in the overall school electric bill when all lights are upgraded. For a detailed program description, see Attachment 5.

Non-Residential Existing Facilities

This proposed program provides prescriptive incentives to owners and operators of large non-residential facilities for energy-efficiency improvements in lighting, HVAC, motors, and refrigeration measures. The program will provide custom incentives for implementation of energy-efficiency measures not covered by the prescriptive list. In addition, the program will subsidize the cost of retro-commissioning projects to systematically optimize the operation of existing buildings. The program also provides training and technical assistance for commercial contractors and education for facility owners and operators. For a detailed program description, see Attachment 6.

Non-Residential New Construction and Major Renovation

This proposed program includes three components: design assistance, custom efficiency, and prescriptive measures. Design assistance involves efforts to integrate energy-efficiency into a customer's design process to influence equipment/systems selection and specification as early in the design process as possible. Custom efficiency provides the opportunity to implement energy-efficiency measures not covered by prescriptive incentives for large non-residential customers and provides for feasibility studies to assess

the savings from complex applications. A list of prescriptive measures and incentives is provided for energy-efficiency improvements in lighting, HVAC, motor upgrades, and refrigeration measures. For a detailed program description, see Attachment 7.

Small Non-Residential

This proposed program provides prescriptive incentives to small non-residential customers for energy-efficiency improvements in lighting, HVAC, motors, and refrigeration applications through a simple and straightforward mechanism for program participation. The program also includes training for contractors and promotion of commercial qualified contractors. The program supports "one-source" energy audits and the installation of energy-efficiency equipment to make the process simple for small non-residential customers. The program also provides educational materials to assist building owners and operators in making decisions to improve the energy-efficiency of their facilities. For a detailed program description, see Attachment 8.

Building Operator Training

This proposed program provides subsidized training for building operators (managers) and facility maintenance technicians on energy-efficient building operating and maintenance practices. The program is designed to help building operators and facility maintenance personnel better understand how their facilities use energy and how to better manage energy costs. Participants learn the benefits of purchasing high-efficiency equipment, as well as equipment operation and maintenance practices to improve efficiency. For a detailed program description, see Attachment 9.

Energy Information Services

This proposed program provides a web-based energy information tool, which includes real time (or near real time) feedback on customer energy consumption and load profiles. Large facility energy managers will receive tools to graphically analyze consumption trends, compare multiple facilities, benchmark their performance, and track their energy-efficiency efforts. The program supports the cost of providing the energy information service and offers the service for a small price to large non-residential customers. For a detailed program description, see Attachment 10.

IV. Budget

Consistent with Decision No. 67744 (Attachment A, paragraph 40), APS is obligated to spend \$48 million dollars on energy-efficiency DSM programs from 2005-2007. The proposed division of funds between residential and non-residential customers is commensurate with the relative contribution to the DSM funds from these customer classes and is also consistent with the preliminary list of programs and funding allocation shown in the "Preliminary Energy-Efficiency DSM Plan" (Decision No. 67744 Attachment A, Appendix B). Exhibit 2 on pages 10 and 11 shows the list of programs from the Preliminary Energy Efficiency DSM Plan and makes a comparison to the APS Portfolio Plan, including a description of minor modifications that were made during the program development process in conjunction with the DSM collaborative group.

The proposed budget maximizes the amount of program funds that go directly to customers through rebates and incentives, training and technical assistance, and consumer education. This plan also takes into account the realities of DSM program start-up costs and funds needed to adequately plan, develop and deliver and evaluate quality programs. It typically takes two years or more to ramp up programs and achieve significant customer participation levels and program savings. This Portfolio Plan recognizes program ramp-up costs over the 2005-2007 program planning period. Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.

Exhibit 2
Comparison of Portfolio Plan Budget
To the Preliminary Energy-Efficiency DSM Plan

Preliminary Energy-Efficiency DSM Plan ¹		Proposed Portfolio Plan Budget		Variance Description
Programs Organized by Market or Customer Segment	Annual Budget (millions)	Proposed Average Annual Budget	Programs Organized by Market /Cust. Segment	
C&I New Construction	\$2,700,000	\$2,453,358	Large Non-Residential New Construction	The Non-Residential new construction budget was reduced to partially fund Schools, Building Operator Training and Energy Information Services in the Non-Residential existing facilities budget.
C&I Retrofit of Existing Facilities	\$2,500,000	\$560,000	Schools	The Settlement did not have a budget specifically for schools. This budget is funded from each of the three main Non-Residential budgets.
		\$2,253,358	Large Non-Residential Existing	The "Non-Residential Retrofit of Existing Facilities" budget is redistributed within the same budget category to partially fund Schools, Building Operator Training and Energy Information Services.
		\$80,000	Building Operator Training	The Settlement did not have a budget specifically for building operator training. This budget is funded from each of the three main Non-Residential budgets.
		\$100,000	Energy Information Services	The Settlement did not have a budget specifically for Energy Information Services. This budget is funded from the Large New Construction and Large Existing Programs.
		\$2,993,358	Total Non-Residential Existing	This is the sum of the C&I Retrofit of Existing Facilities. The total budget is increased to fund Schools, Building Operator Training and Energy Information Services.

¹ Appendix B to the APS Settlement Agreement, included in Decision 67744.

Small Business	\$1,700,000	\$1,453,284	Small Non-Residential Program	The small business budget was reduced to partially fund the Schools and Building Operator Training programs.
C&I Subtotal	\$6,900,000	\$6,900,000		

**Comparison of Portfolio Plan Budget to Preliminary
Energy-Efficiency DSM Plan
Exhibit 2 Continued**

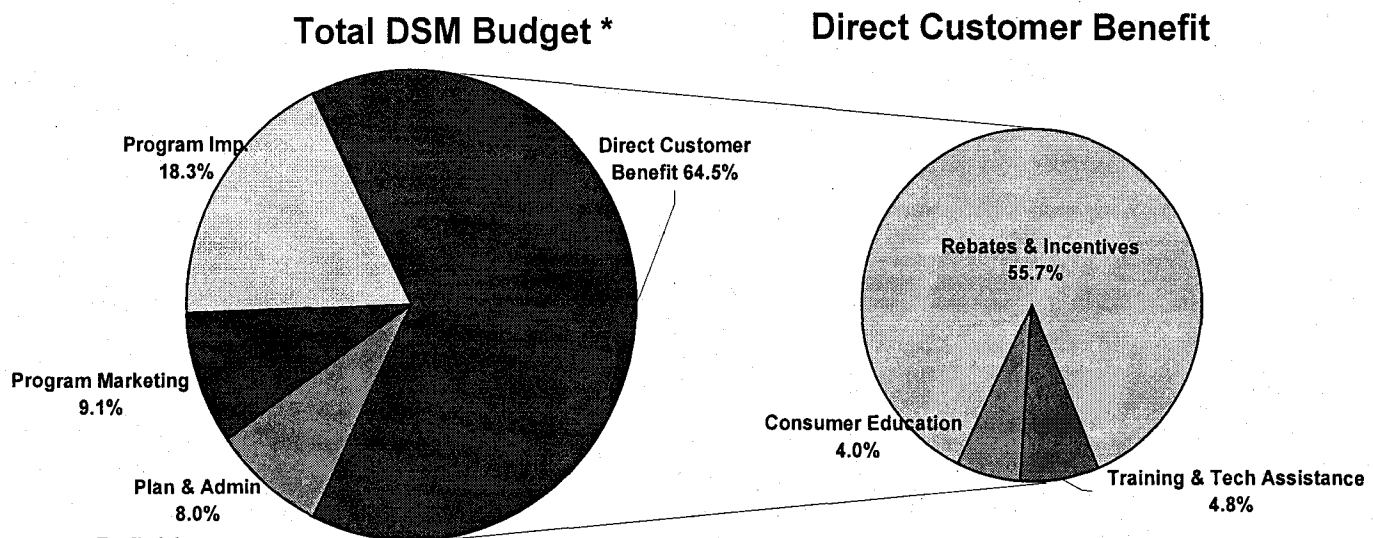
Preliminary Energy-Efficiency DSM Plan		Portfolio Plan Budget		Variance Description
Programs Organized by Market or Customer Segment	Annual Budget (millions)	Proposed Average Annual Budget	Programs Organized by Market or Customer Segment	
Residential New Construction	\$2,400,000	\$2,063,088	Residential New Construction	This budget was reduced commensurate with increased funding provided to the Consumer Products and Residential Low Income programs.
Residential Existing Homes and HVAC	\$1,400,000	\$1,195,245	Residential Existing Home HVAC	This budget was reduced commensurate with increased funding provided to the Consumer Products and Residential Low Income programs.
Residential Consumer Products	\$1,400,000	\$1,841,667	Residential Consumer Products	As a result of discussions with the DSM collaborative group, funding was increased for the Consumer Products program. This program has significant energy savings potential, is highly cost effective, and is available to virtually every residential customer.
Residential Low Income	\$1,000,000	\$1,100,000	Residential Low Income	\$100,000 has been added to the budget to serve the Native Americans.
Residential Subtotal	\$6,200,000	\$6,200,000		
Residential and C&I Programs Subtotal	\$13,100,000	\$13,100,000		
Measurement, Evaluation and Research ²	\$1,300,000	\$1,300,000	Measurement, Evaluation and Research	NA
Performance Incentive	\$1,600,000	\$1,600,000	Performance Incentive	NA
Total	\$16,000,000	\$16,000,000		

² Inclusive of pre-approval expenditures of up to \$500,000 for the baseline market assessment approved in Decision No. 67816.

Exhibit 3 (below) provides a pie chart that depicts the percentage of DSM Energy Efficiency funds that will go directly to customers and the overall portfolio budget allocation for all program costs. It does not include Measurement, Evaluation & Research, or Performance Evaluation.

A total of 64.5% of the program costs benefit customers directly in the form of incentives, training or education. Other costs such as program implementation and marketing expenses are necessary to deliver programs to customers.

Exhibit 3 2005-2007 DSM Program Budget



Definitions

Rebates & Incentives - Includes dollars that go toward customer rebates and incentives, installation of low income weatherization, and low income bill assistance.

Training & Technical Assistance - Includes all dollars that are used for energy-efficiency training and technical assistance.

Consumer Education - Includes dollars that are used to support general consumer education about energy-efficient improvements.

Program Implementation - Program delivery costs associated with implementing the program -- includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Program Marketing - Includes all expenses related to marketing the program and increasing DSM consumer awareness (direct program marketing costs as opposed to general consumer education).

Planning and Administration - APS costs to plan, develop and administer programs - includes management of program budgets, oversight of the RFP process and implementation contractor, program development, program coordination and general overhead expenses.

* Excludes Measurement, Evaluation, and Research

Exhibit 4 below shows a summary roll-up of the anticipated cumulative spending for each program from 2005-2007. Exhibits 5, 6 and 7 (pages 14 – 16) display the estimated budget allocation between the years 2005, 2006, 2007 respectively for each proposed energy-efficiency program. These budgets represent the most accurate estimate of future spending; however, to the extent that certain programs achieve greater success and market penetration than others, it is important to be able to adjust budgets accordingly within the class to maximize the effectiveness of the overall portfolio.

Exhibit 4 2005-2007 DSM Portfolio Estimated Budget

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implement	Program Marketing	Planning & Admin	Program Total Cost
Residential							
Consumer Products	3,300,000	240,000	300,000	795,000	570,000	320,000	5,525,000
Res Existing Home HVAC	1,620,000	293,000	540,000	518,498	394,238	220,000	3,585,736
Res New Construction	3,400,000	306,000	300,000	997,000	873,750	312,513	6,189,263
Low Income	2,865,000	30,000	15,000	150,000	15,000	225,000	3,300,000
Totals for Residential	\$11,185,000	\$869,000	\$1,155,000	\$2,460,498	\$1,852,988	\$1,077,513	\$18,599,999
Non-Residential							
Schools	1,113,000	183,000	25,000	125,000	25,000	209,000	1,680,000
Small Business	2,207,175	152,596	87,196	1,079,972	396,928	435,984	4,359,851
Lrg Non-Res Existing	3,422,287	236,603	135,203	1,674,527	615,448	676,007	6,760,075
Lrg Non-Res New Const	3,726,037	257,603	147,202	1,823,152	670,074	736,007	7,360,075
Bldg Operator Training	0	192,000	6,000	21,000	9,000	12,000	240,000
Energy Information Svc	240,000	10,500	6,000	24,000	7,500	12,000	300,000
Totals for Non-Residential	\$10,708,499	\$1,032,302	\$406,601	\$4,747,651	\$1,723,950	\$2,080,998	\$ 20,700,001
Segment Totals	\$21,893,499	\$1,901,302	\$1,561,601	\$7,208,149	\$3,576,938	\$3,158,511	\$ 39,300,000
% of Cost By Category	55.7%	4.8%	4.0%	18.3%	9.1%	8.0%	

Annual Portfolio Budgets	
2005	\$13,000,000
2006	\$16,000,000
2007	\$19,000,000

Program Costs	\$39,300,000
Measurement, Evaluation & Research	\$3,900,000
Performance Incentive	\$4,800,000
TOTAL	\$48,000,000

Exhibit 5**2005 DSM Portfolio Estimated Budget**

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implement	Program Marketing	Planning & Admin	Program Total Cost
Residential							
Consumer Products	1,100,000	80,000	110,000	280,000	200,000	130,000	1,900,000
Res Existing Home HVAC	400,000	53,000	120,000	135,000	100,000	60,000	868,000
Res New Construction	600,000	65,000	60,000	202,000	183,750	62,000	1,172,750
Low Income	955,000	10,000	5,000	50,000	5,000	75,000	1,100,000
Totals for Residential	\$3,055,000	\$208,000	\$295,000	\$667,000	\$488,750	\$327,000	\$5,040,750
Non-Residential							
Schools	331,000	50,000	7,000	13,000	7,000	47,000	455,000
Small Business	531,357	41,328	23,615	354,238	112,175	118,079	1,180,792
Lrg Non-Res Existing	823,884	64,080	36,618	549,256	173,931	183,085	1,830,854
Lrg Non-Res New Const	897,009	69,767	39,868	598,006	189,369	199,335	1,993,354
Bldg Operator Training	0	52,000	1,625	5,688	2,437	3,250	65,000
Energy Information Srvc	65,000	2,844	1,625	6,500	2,031	3,250	81,250
Totals for Non-Residential	\$2,648,250	\$280,019	\$110,351	\$1,526,688	\$486,943	\$553,999	\$5,606,250
Segment Totals	\$5,703,250	\$488,019	\$405,351	\$2,193,688	\$975,693	\$880,999	\$10,647,000
% of Cost By Category	53.6%	4.6%	3.8%	20.6%	9.2	8.3%	

Program Costs	\$10,647,000
Measurement, Evaluation & Research	\$1,053,000
Performance Incentive	\$1,300,000
TOTAL	\$13,000,000

Exhibit 6

2006 DSM Portfolio Estimated Budget

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implement	Program Marketing	Planning & Admin	Program Total Cost
Residential							
Consumer Products	1,100,000	85,000	100,000	250,000	190,000	100,000	1,825,000
Res Existing Home HVAC	520,000	85,000	170,000	158,498	140,000	65,000	1,138,498
Res New Construction	1,100,000	121,000	120,000	365,000	320,000	110,500	2,136,500
Low Income	955,000	10,000	5,000	50,000	5,000	75,000	1,100,000
Total for Residential	\$3,675,000	\$301,000	\$395,000	\$823,498	\$655,000	\$350,500	\$6,199,998
Non-Residential							
Schools	346,000	61,000	8,000	56,000	8,000	81,000	560,000
Small Business	726,642	50,865	29,066	363,321	138,062	145,328	1,453,284
Lrg Non-Res Existing	1,126,679	78,868	45,067	563,340	214,069	225,336	2,253,359
Lrg Non-Res New Const	1,226,679	85,868	49,067	613,340	233,069	245,336	2,453,359
Bldg Operator Training	0	64,000	2,000	7,000	3,000	4,000	80,000
Energy Information Svc	80,000	3,500	2,000	8,000	2,500	4,000	100,000
Total for Non-Residential	\$3,506,000	\$344,101	\$135,200	\$1,611,001	\$598,700	\$705,000	\$6,900,002
Segment Totals	\$7,181,000	\$645,101	\$530,200	\$2,434,499	\$1,253,700	\$1,055,500	\$13,100,000
% of Cost By Category	54.8%	4.9%	4.0%	18.6%	9.6%	8.1%	

Program Costs	\$13,100,000
Measurement, Evaluation & Research	\$1,300,000
Performance Incentive	\$1,600,000
TOTAL	\$16,000,000

Exhibit 7

2007 DSM Portfolio Estimated Budget

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implement	Program Marketing	Planning & Admin	Program Total Cost
Residential							
Consumer Products	1,100,000	75,000	90,000	265,000	180,000	90,000	1,800,000
Res Existing Home HVAC	700,000	155,000	250,000	225,000	154,238	95,000	1,579,238
Res New Construction	1,700,000	120,000	120,000	430,000	370,000	140,013	2,880,013
Low Income	955,000	10,000	5,000	50,000	5,000	75,000	1,100,000
Total for Residential	\$4,455,000	\$360,000	\$465,000	\$970,000	\$709,238	\$400,013	\$7,359,251
Non-Residential							
Schools	436,000	72,000	10,000	56,000	10,000	81,000	665,000
Small Business	949,176	60,403	34,515	362,413	146,691	172,577	1,725,775
Lrg Non-Res Existing	1,471,724	93,655	53,518	561,931	227,448	267,586	2,675,862
Lrg Non-Res New Const	1,602,349	101,968	58,267	611,806	247,636	291,336	2,913,362
Bldg Operator Training	0	76,000	2,375	8,312	3,563	4,750	95,000
Energy Information Srvc	95,000	4,156	2,375	9,500	2,969	4,750	118,750
Total for Non-Residential	\$4,554,249	\$408,182	\$161,050	1,609,962	\$638,307	\$821,999	\$8,193,749
Segment Totals	\$9,009,249	\$768,182	\$626,050	\$2,579,962	\$1,347,545	\$1,222,012	\$15,553,000
% of Cost By Category	57.9%	4.9%	4.0%	16.6%	8.7%	7.9%	

Program Costs	\$15,553,000
Measurement, Evaluation & Research	\$1,547,000
Performance Incentive	\$1,900,000
TOTAL	\$19,000,000

V. Program Energy Savings and Benefits

The Company has projected the energy savings, costs and net benefits associated with each of the programs in the proposed DSM Portfolio. For the analysis of net program benefits, the company uses the utility system avoided cost savings (including capacity value, fuel and operations/maintenance savings, and transmission and distribution savings) that will result from the expected lifetime energy savings and peak demand reductions generated by each DSM program in the proposed Portfolio for measures implemented from 2005-2007.

Exhibit 8 on page 18 provides a table that details the expected lifetime energy savings and peak demand savings from each proposed DSM program and a summary of the net benefits generated. The lifetime energy savings are the estimated savings that will result over the expected lifetime of all program measures. The net societal benefits are the total societal benefits less the total societal costs:

	Total Societal Benefits	\$131 Million
Less	<u>Total Societal Costs</u>	<u>\$ 63 Million</u>
	Net Societal Benefits	\$ 68 Million

It is anticipated that over the expected lifetime of all measures the Portfolio will produce net benefits of approximately \$68 million from measures implemented in 2005-2007 timeframe, with a total societal cost test benefit/cost ratio of 2.08 (societal benefits / societal costs = \$131 million / \$63 million).

In addition to the estimated savings and benefits shown in Exhibit 8, the Portfolio is anticipated to produce other societal benefits. Exhibit 9 on page 20 shows an estimate of the water savings (both utility system water savings and direct customer water savings) and air emissions reductions that are expected as a result of the energy saved by program measures. Significant additional benefits which are difficult to quantify at this point include the benefits of higher consumer awareness about energy-efficiency which are hoped to create permanent market transformation effects by influencing future energy-efficiency purchasing decisions and energy use habits. The program also produces other societal benefits including support for low-income households including tribal households.

See the program descriptions in the Attachments for more information about the estimated savings and net benefits from each proposed DSM program.

Exhibit 8

DSM Electric Savings Estimated Benefits 2005 – 2007 Programs

	Capacity Savings MW	Lifetime* MWh Savings	Program Budget	Societal Benefits	Societal Costs	Net Benefits
Residential						
Consumer Products	13.7	499,000	\$5,525,000	\$23,120,000	\$8,980,000	\$14,140,000
Existing Home HVAC	3.2	133,000	\$3,585,000	\$7,960,000	\$5,820,000	\$2,140,000
New Construction	9.1	432,000	\$6,190,000	\$22,200,000	\$7,890,000	\$14,310,000
Low Income	0.5	51,000	\$3,300,000	\$1,810,000	\$2,510,000	\$ (700,000)
Totals for Residential	26.5	1,115,000	\$ 18,600,000	\$55,090,000	\$25,200,000	\$29,890,000
Non-Residential						
Existing Facilities Large	8.4	768,000	\$6,760,000	\$24,400,000	\$8,450,000	\$15,950,000
Small Non-Residential	6.3	540,000	\$4,360,000	\$15,900,000	\$5,160,000	\$10,740,000
New Construction	6.8	735,000	\$7,360,000	\$26,730,000	\$10,510,000	\$16,220,000
Building Operator Training	0.6	74,000	\$240,000	\$2,760,000	\$860,000	\$1,900,000
Energy Information System	0.3	41,000	\$300,000	\$1,510,000	\$350,000	\$1,160,000
Schools	2.8	162,000	\$1,680,000	\$4,540,000	\$3,740,000	\$800,000
Totals for Non-Residential	25.2	2,320,000	\$20,700,000	\$75,840,000	\$29,070,000	\$46,770,000
Subtotal	51.7	3,435,000	\$39,300,000	\$130,930,000	\$54,270,000	\$76,660,000
Measurement, Evaluation & Research			\$3,900,000		\$3,900,000	
Performance Incentive			\$4,800,000		\$4,800,000	
Total	51.7	3,435,000	\$48,000,000	\$130,930,000	\$62,970,000	\$67,960,000
<i>* Refers to savings over the expected lifetime of all program measures. All MWh values are rounded to the nearest 1,000 and monetary values are rounded to the nearest \$10,000.</i>						

Environmental Benefits

Exhibit 9 on page 20 shows the expected savings in water consumption and air emissions that will result from energy saved over the expected lifetime of all program measures of the proposed DSM portfolio.

Consistent with the ACC Staff's proposed draft DSM Rule R14-2-1704, the Company has made a "good faith effort" to quantify the physical units of air emissions and water savings that occur as a result of DSM energy-efficiency.

In calculating these environmental benefits, APS believes that the most appropriate values to associate with DSM measures are those from the newest combined cycle plants. These natural gas fired plants represent APS' last significant dispatch group and a large portion of the market for power purchased by APS. Any load reduction due to DSM measures will most likely displace generation from this type of plant.

The values proposed represent average emissions from Pinnacle West/APS' newer combined cycle generating units. These values are meant to reasonably approximate newer combined cycle plants and the air emissions and water consumption savings that may be avoided through DSM measures. APS did not conduct a detailed study of DSM measures, power supply or regional emissions for purposes of developing these emissions values. APS' approach is based on general experience related to power dispatch, reported emissions, the current electricity market, and energy-efficiency measures. APS believes this approach is a reasonable and cost-effective method of addressing environmental externalities associated with DSM.

The values that are used to calculate the DSM Environmental Benefits shown in Exhibit 9 on page 20 are as follows:

SOx	.0043 lbs/MWh
NOx	.172 lbs/MWh
CO2	917 lbs/MWh
PM10	.0237 lbs/MWh
Water	233 gallons/MWh (utility water savings only)

For all measures that result in customer water savings, the calculation of water savings shown in Exhibit 9 includes both customer and utility water savings.

Exhibit 9

DSM Estimated Environmental Benefits 2005 - 2007 Programs

	Water** Mil Gal	SOx Lbs	NOx Lbs	CO2 Mil Lbs	PM10 Lbs
Residential					
Consumer Products *	769.3	2,146	85,854	457.7	11,830
Existing Home HVAC	31.1	574	22,958	122.4	3,163
New Construction	100.7	1,858	74,340	396.3	10,243
Low Income	11.8	217	8,687	46.3	1,197
Totals for Residential	912.9	4,795	191,839	1,022.7	26,433
Non-Residential					
Existing Facilities Large	179.7	3,161	126,432	674.1	17,421
Small Non-Residential	132.4	2,320	92,785	494.7	12,785
New Construction	179.7	3,161	126,432	674.1	17,421
Building Operator Training	17.2	317	12,677	67.6	1,747
Energy Information System	9.5	174	6,977	37.2	961
Schools	36.4	697	27,876	148.6	3,841
Totals for Non-Residential	554.9	9,830	393,179	2,096.3	54,176
Total	1,467.8	14,625	585,018	3,119.0	80,609

The environmental reductions are based on the kWh savings of all program measures over their expected lifetimes.

** High efficiency dishwashers and clothes dryers use less hot water compared to standard-efficiency models. For those homes that are dual fuel, customers will realize additional natural gas savings. The estimated total natural gas savings is 830,832 therms for 2005-2007.*

*** For all measures that result in customer water savings, this calculation includes both customer and utility water savings.*

VI. Program Marketing and Delivery

To maximize program cost effectiveness and customer acceptance, the overall concept for program delivery involves working within existing markets whenever possible to take advantage of natural opportunities to promote efficiency at the time that customers are making energy-related purchasing decisions. This involves working closely with key market players and contractors involved in new construction, renovations, and equipment replacement and repair opportunities. This Plan will also include targeted communication to encourage participation among Native Americans. This approach is key for delivering information and incentives about efficiency at the time that these decisions are being made by customers. The objective is to capitalize on these DSM opportunities, while targeting messages to help customers understand their options for improving energy-efficiency and saving energy costs.

APS proposes that programs be implemented using a mix of both in-house and outsourced resources. This enables the Company to take advantage of outsourced experts who have implemented similar programs in other areas, while also using in-house resources where appropriate to integrate the DSM programs into a wide range of customer communications and outreach efforts. For all programs, APS will retain responsibility for program administration and reporting activities. APS intends to issue Requests for Proposal ("RFPs") to qualified firms for all significant activities that will be outsourced.

Exhibit 10 on page 22 provides a timeline that shows key dates and program implementation activities. For a detailed description of the proposed implementation schedule and plans for in-house versus outsourced implementation models for each individual program, see the program descriptions included in the Attachments.

Exhibit 10
TASK TIMELINE
(4th Qtr. 2004 – 4th Qtr. 2007)

Tasks	2004	2005				2006				2007			
	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Informal Meetings with Pre-Collaborative Group													
Public Input Meetings													
Settlement of Rate Case													
Program Planning & Development with Collaborative													
Submitted Low Income & Weatherization Program													
Submitted Consumer Products Program													
Submit Portfolio Plan - All Programs Plans													
Contractor RFP Process													
ACC Review & Approval													
Program Marketing & Communication Planning													
Mid-Year Reports													
Consumer Products Kick-Off*													
Self-Direction Study													
Review & Select IC Contractor*													
Baseline Study Results													
Upcoming Year Planning Including Review of Incentive Levels													
Program Kick-Off*													
Program Implementation*													
Year-End Report													
Program Process Evaluation Including Contractor Review / Assessment*													
Submit Updated Portfolio Plan (Biennial Submittal)													
Program Impact Evaluation													

**These tasks will be completed after ACC approval of the program, and the timeline will be adjusted accordingly.*

VII. Program Measurement, Evaluation and Research

Measurement, evaluation and research ("MER") is an essential part of the proposed DSM Portfolio Plan. The Preliminary Energy-Efficiency DSM Plan (Decision No. 67744 Attachment A, Appendix B) of the APS Settlement Agreement specifies that \$3.9 million of the \$48 million budget from 2005-2007 should be devoted to measurement, evaluation and research activities.

There are several distinct deliverables that are anticipated from MER activities, including: identification of current baseline efficiency levels and the market potential of DSM measures, process evaluation to indicate how well programs are working to achieve objectives, verification that energy-efficiency measures are installed as expected, savings measurement to track the actual program savings that are achieved, and research activities to identify additional opportunities for energy-efficiency.

In Decision No.67816, the ACC pre-approved the expenditure of up to \$500,000 of DSM funds for a market assessment study, which will provide reliable information on the market potential, kW and kWh savings potential and costs associated with energy-efficiency technologies. Specifically, the DSM study will assess the potential for improving the market penetration of energy-efficient technologies and practices in residential and non-residential customer segments. The study information, expected before the end of 2005, will be used to confirm program design assumptions and to target programs to maximize cost effectiveness.

In general, the approach for measurement and evaluation will be to integrate data collection and tracking activities directly into the program implementation process. This saves program costs and produces better results by collecting data directly at the time that measures are installed. In order to do this, it is necessary to employ MER experts early in the program development process to help design forms and data collection and tracking tools to be used during program implementation.

APS intends to use an independent third party evaluation contractor to conduct evaluations. Prior to program implementation, APS will issue an RFP to retain an evaluation contractor. The evaluation contractor will then work directly with APS and any implementation contractors to ensure that program design and implementation activities will collect the necessary data for monitoring and evaluation.

APS anticipates that evaluation activities for each year of the portfolio planning period will follow the general outline shown below:

2005 Baseline and market potential study
Program tracking database development
MER planning and development

2006 Program process evaluation
Identifying opportunities to improve implementation
Installation verifications

2007 Program impact evaluation

For more information about the MER plan for each proposed DSM program, see the program descriptions in the Attachments.

VIII. DSM Performance Incentive

The ACC approved a performance incentive based on the net economic benefits of energy-efficiency DSM in Decision No. 67744. *See*, Attachment A, paragraph 45, which states in part:

APS will be permitted to earn and recover a performance incentive based on a share of the net economic benefits (benefits minus costs) from the energy-efficiency DSM programs approved in accordance with paragraph 41. Such performance incentive will be capped at 10% of the total amount of DSM spending, inclusive of the program incentive, provided for in this Agreement (e.g. \$1.6 million out of the \$16 million average annual spending referenced in paragraphs 40 and 44 or \$4.8 million over the initial three-year period).

Exhibit 11, page 26, shows the estimated portfolio total net benefits from 2005-2007 and proposes a 90%/10% split, between customers and the company respectively, of the total net benefits to determine the incentive that APS would receive for delivering approved DSM programs. As stipulated in the Preliminary Energy-Efficiency DSM Plan (Decision No. 67744 Attachment A, Appendix B), the performance incentive is inclusive in the annual \$16 million commitment and capped at 10% for a maximum potential incentive of \$4.8 million during 2005-2007 timeframe. The actual performance incentive will vary based on the actual net benefits achieved.

The incentive earned will be reported in the semi-annual reports filed with the ACC pursuant to Decision No. 67744, Attachment A, paragraph 52. The incentive will be determined for each reporting period based on the savings and net benefits reported for that period.

Exhibit 11 **Estimated Performance Incentive Calculation** **2005 - 2007 Program Budget**

	Total Benefits	Total Costs	Net Benefit	APS Share 10%
Residential				
Consumer Products	\$23,120,000	\$8,980,000	\$14,140,000	\$1,414,000
Existing Home HVAC	\$7,960,000	\$5,820,000	\$2,140,000	\$214,000
New Construction	\$22,200,000	\$7,890,000	\$14,310,000	\$1,431,000
Non-Residential				
Existing Large	\$24,400,000	\$8,450,000	\$15,950,000	\$1,595,000
Existing Small	\$15,900,000	\$5,160,000	\$10,740,000	\$1,074,000
New Construction	\$26,730,000	\$10,510,000	\$16,220,000	\$1,622,000
Building Operator Training	\$2,760,000	\$860,000	\$1,900,000	\$190,000
Energy Information System	\$1,510,000	\$350,000	\$1,160,000	\$116,000
Schools	\$4,540,000	\$3,740,000	\$800,000	\$80,000
Subtotal	\$129,120,000	\$51,760,000	\$77,360,000	\$7,736,000
Measurement, Evaluation & Research	\$0	\$3,900,000	\$ (3,900,000)	\$ (390,000)
Total	\$129,120,000	\$55,660,000	\$73,460,000	\$7,346,000
Maximum Performance Incentive				\$4,800,000
Difference				\$2,546,200
This calculation does not include the Low Income Program. This program has a negative net benefit and APS should not be penalized for performing well on this program. A summary of this program is:				
Low Income	Total	Total	Net	
	Benefits	Costs	Benefit	
	\$1,810,000	\$2,510,000	\$ (700,000)	

Attachments Program Plans

Residential Programs

APS Residential New Construction Program	Attachment 1
Residential Existing Homes HVAC Efficiency Program	Attachment 2
High Efficiency Consumer Products Program	Attachment 3
APS Energy Wise Low Income Weatherization Program	Attachment 4

Non-Residential Programs

APS Schools Program	Attachment 5
Non-Residential DSM Program for Existing Facilities	Attachment 6
Non-Residential New Construction and Major Renovation Program	Attachment 7
Small Non-Residential DSM Program	Attachment 8
Building Operator Training Program	Attachment 9
Energy Information Services Program	Attachment 10

Attachment 1

Residential New Construction

APS Residential New Construction Program

Program Concept and Description

- This program promotes high-efficiency construction practices for new homes. The program emphasizes the whole-building approach to improving energy efficiency and includes field testing of homes to ensure performance. Participating builders will be trained to apply building science principles to assure that high-efficiency homes also have superior comfort and performance.
- The program will promote homes that meet EPA/DOE Energy Star Homes® performance requirements. Energy Star® home efficiency levels are set to increase on January 1, 2006. This program will be based on the new more stringent Energy Star® standard. The program will encourage builders to exceed Energy Star® standards whenever possible, including working with builders who offer guaranteed heating and cooling costs as a component of their energy-efficiency package.
- To encourage program participation by builders, the program will provide incentives for builders including incentives to meet 2006 Energy Star® building standards and upgrade to high-efficiency lighting and appliances.
- The program will continue to offer education and training for homebuyers, builders, contractors and Realtors/builder sales agents aimed at increasing the applied knowledge of building science and energy-efficient building practices. The program will seek to offer frequent training opportunities and supplement national trainers with local training resources when possible.

Target Market

- The target market is comprised of all newly-constructed single family homes that receive electric service from APS; including production home developments and custom home projects. The program will be targeted to residential growth areas within the APS territory including outside the Phoenix metro area where applicable.

Current Baseline Conditions

- The current market is dominated by production home builders who represent more than 80% of total new home sales in the Phoenix area. Outside the metro area, the market includes pockets of production home building in some growth areas (i.e. Prescott Valley). In most other areas of the APS service territory, the market is dominated by custom and manufactured housing.
- It is estimated that approximately 15-20% of all homes built in the Phoenix metro area currently meet Energy Star® standards. APS estimates that since 2001, over 12,000 new homes have been committed to be built to Energy Star® "plus" standards, including offering buyers guaranteed heating and cooling costs (APS Performance Built Homes™).
- On January 1, 2006, a new more stringent Energy Star Homes® performance standard takes effect. The new standard will be significantly higher than the current Energy Star® standard. Many builders who meet the current Energy Star® program standard will find it difficult to meet the new program standards. The APS program will enter the market at a key time to keep Energy Star® penetration from slipping.
- In 2004, over 60,000 new home building permits were issued in the Phoenix metro area, making Phoenix the most active new housing market in the country. In the face of tremendous buyer demand and intense building activity it is difficult to encourage builders to make changes in construction practices. Market assessments from local experts indicate that the current "hot" market is expected to continue into the foreseeable future, although there is some potential that higher interest rates and rising home prices could slow the pace of the market.
- Current utility and Energy Office initiatives that have influenced this market include building science training to stimulate builder know-how, utility promotion and incentives, third-party inspection to verify performance, and consumer education and energy bill guarantees to stimulate demand.

Program Eligibility

- Must be a builder of newly-constructed residential single family homes built in the APS service territory.
-

APS Residential New Construction Program

Program Rationale

- The pace of residential new construction in the APS service territory, particularly the Phoenix metro area, is one of the biggest drivers of APS' system load growth. It is much easier and more cost effective to work with builders to implement energy efficiency at the time of construction rather than attempt to retrofit efficiency after a home has been built. For many new home measures such as building envelope improvements, the benefits of energy-efficiency upgrades will be sustained for the life of the home to produce very cost effective savings.

Program Objectives

- Incorporate the EPA/DOE Energy Star® designation and 2006 Energy Star® performance standards into the program.
- Retain existing builder participation in current Performance Built and Energy Star Homes® programs and encourage the participation of new builders.
- Increase the overall number and penetration of homes built to program standards.
- Stimulate the installation of high SEER (14 or higher) air conditioning equipment that also has high EER (12 or higher) ratings. SEER is an abbreviation for Seasonal Energy Efficiency Rating. It is the most commonly used measure of the efficiency of consumer central air conditioning systems. SEER considers yearlong operation, whereas EER (Energy Efficiency Ratio) refers to maximum or full load. Therefore, SEER gives an indication of energy (kWh) requirements of a unit and EER gives an indication of demand (kW) needs.
- Promote upgrades to Energy Star® appliances and high-efficiency lighting to improve whole house efficiency performance.
- Assist builder sales agents with promoting and selling energy-efficient homes. Provide information to help explain the benefits of energy efficient features.
- Train builder construction staff and subcontractors in advanced building science concepts to increase energy efficiency through improved design and installation practices.
- Increase homebuyer awareness and understanding of energy-efficient building practices and the benefits of purchasing an energy efficient home.

Products and Services Provided

- Promotion of homes that meet or exceed 2006 EPA Energy Star Homes® performance standards. A copy of the proposed 2006 EPA Energy Star Homes® standard is included in Appendix 1.
- Builder and contractor education and training
- Homebuyer and realtor/sales agent awareness and education materials
- Builder incentives for meeting Energy Star Homes® standards. Incentive levels are equivalent to approximately 50% of the incremental cost for a builder to meet the Energy Star® Homes program standards. Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff. The incentive level is shown in the following table:

Residential New Construction Incentives	
Meets 2006 EPA/DOE Energy Star Homes® program standard (including high efficiency HVAC, building envelope, lighting and appliances)	\$400/home

Delivery Strategy and Administration

- This program will be managed in house by APS.
- APS will provide program administration, marketing, planning, coordination of builder and contractor training and consumer education activities.
- Some program activities such as training, incentive processing, and other program support may be provided in-house or through specialized vendors.
- Key trade ally relationships include:
 - EPA/DOE – Energy Star Homes® – certification standard and program branding
 - Building science trainers – training and education
 - The Arizona Energy Office – training, education and awareness building
 - Testing/inspection contractors – third party performance verification, energy ratings

APS Residential New Construction Program

- A program implementation flow chart is included in Appendix 2.

Marketing and Communications

- APS provides program marketing and awareness including bill stuffers, consumer education pieces, website content, media ads, promotion of the Energy Star® label, etc.
- The proposed marketing plan for this program will consist of the elements shown in the table below.

Target Market	Marketing Initiative
Builders	<ul style="list-style-type: none"> • Advertising and article placements in builder trade publications • Direct sales through APS builder account representative • Leverage third party partnerships for marketing and sales support • Point of sale materials and sales tools for builder sales agents • Leverage home builder association membership • APS website • APS builder training events • Builder trade shows
Realtors	<ul style="list-style-type: none"> • Advertising and article placements in Realtor trade publications and new home directory listings • APS website • Realtor training events • Realtor trade shows
Homebuyers	<ul style="list-style-type: none"> • Targeted homebuyer publications • Co-op ads with builders and trade partners • APS website, on-line advertising on homebuyer websites • Point of sale materials at builder sales offices and model homes • APS informational materials and homebuyer guides • APS Energy Answer Line

Program Implementation Schedule

- Continue existing APS Performance Built Home™ program until the implementation of any new program elements. Provide time to transition builders to new program as needed.
- The following table shows the estimated timeline for key program activities by quarter.

Program Activity	Timeline											
	2005			2006			2007					
Continue ongoing PBH program												
New program pre-approval submit												
New Program Approval (estimated)												
Results from EPA study of Phoenix new homes												
New Program development/builder research												
Marketing material creation												
Implementation of new program (kick-off)												
Continuous program implementation												
Process evaluation												
Savings verification												
Program redesign as needed												

APS Residential New Construction Program

Monitoring and Evaluation Plan

- APS intends to use an independent third-party evaluation contractor to conduct program evaluations.
- Prior to program implementation, APS will issue an RFP to retain an evaluation contractor. The evaluation contractor will then work directly with APS and the implementation contractor to ensure that program design and implementation activities will collect the necessary data for monitoring and evaluation.
- The strategy for monitoring and evaluation will involve integrated evaluation. With this approach, data is collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data collection at a lower cost.
- In summer/fall 2005, APS will conduct a baseline and market potential study to verify current market conditions and building practices.
- APS will leverage results of ongoing EPA/DOE sponsored study of Phoenix area new homes. APS is a partner in this study of thousands of local standard and energy efficient homes. Results of this study will be available in summer 2005.
- EPA/DOE Energy Star Homes® standards require independent performance testing with a minimum of 15% of all homes randomly tested and inspected to ensure that performance is achieved in the field. In cases where homebuilders offer heating and cooling cost guarantees, these provide additional performance verification.
- The evaluation contractor will conduct quality control of the testing process, oversee field testing paperwork, and conduct random field verification. Homes will be randomly selected for follow-up tests to ensure compliance with standards.

Program Costs

- 2005: \$1,172,750
- 2006: \$2,136,500
- 2007: \$2,880,013
- See Appendix 3 for more information about program costs.

Estimated Energy Savings

- The following table shows estimated energy savings from this program.
- See Appendix 4 for more information about estimated energy savings

Year	Estimated # of homes	Annual Peak kW Demand Savings	Lifetime kWh Savings*
2005	1500	1613	76,272,000
2006	2750	2957	139,832,000
2007	4250	4570	216,104,000
Program Total 2005-2007	8500	9140	432,208,000

*Lifetime kWh savings refers to total energy savings over the expected lifetime of all DSM measures.

APS Residential New Construction Program

Program Cost Effectiveness

Total APS Program Cost 2005-2007	\$/Lifetime kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$6,189,000	\$.0143	\$22,202,935	\$7,888,000	2.81

In addition to the savings shown above, it is estimated that the program will produce these additional benefits:

Water Savings	100,704,465 gallons
Sox	1858 lbs.
Nox	74,340 lbs.
CO2	396,334,736 lbs.
PM10	10,243 lbs.

APS Residential New Construction Program

APPENDIX 1 – Proposed 2006 Energy Star® Homes Standards

National Specifications ENERGY STAR Qualified Homes [DRAFT 2/8/05]

General requirements for the ENERGY STAR Reference Home are specified in the table below. For a home to qualify as ENERGY STAR, the following three conditions must be met:

1. A home must either: a) meet the reference home requirements, or b) have an energy performance that is equivalent or better than these requirements, as determined by a RESNET-accredited rating software program.
2. A home must be verified and field tested according to the HERS Guidelines by a RESNET-accredited Provider.
3. The home must meet all state and local codes.

For county specific information refer to the ENERGY STAR Qualified Homes Verification Checklist at www.energystar.gov/homes.

Hot Climates¹ (2004 IECC Climate Zones 1,2,3)		Mixed and Cold Climates¹ (2004 IECC Climate Zones 4,5,6,7,8)
Cooling Equipment² (Where Provided)	Right-Sized ENERGY STAR Qualified Central A/C or Heat Pump	Right-Sized 13 SEER Central A/C or ENERGY STAR Qualified Heat Pump
Heating Equipment²	Right-Sized Minimum Standard Furnace, Boiler ⁴ or ENERGY STAR Qualified Heat Pump ³	Right-Sized ENERGY STAR Qualified Gas Furnace, Heat Pump ³ , Boiler ⁴ , or 85% AFUE Oil Furnace
Thermostat³	ENERGY STAR Qualified Thermostat	
Ductwork	Leakage Sealed and Tested to ≤ 4 cfm to Outdoors / 100 sq. ft. ⁵ ; and 2004 IECC Compliant Insulation Levels ^{6,7}	
Envelope	Infiltration Sealed and Tested to ≤ 0.35 ac/h ^{8,9} ; and 2004 IECC Compliant Insulation Levels ⁷ ; and Compliance with Thermal Bypass Inspection Checklist ¹⁰	
Windows¹¹	ENERGY STAR Qualified Windows	
Water Heater	Gas 0.60 EF / Electric 0.92 EF / Oil Integrated with Space Heating Boiler ⁴	
Lighting and Appliances^{12,13}	Five or More ENERGY STAR Qualified Light Fixtures, Ceiling Fans and/or Appliances	

APS Residential New Construction Program

Specification Notes - ENERGY STAR Qualified Homes [DRAFT 2/8/05]

1. The appropriate climate zone for each building site is determined by the 2004 International Energy Conservation Code (IECC), Figure 301.1. *NOTE: APS service territory would fall into the 'Hot Climate' designation in the program specification chart.*
2. All requirements for ENERGY STAR qualified equipment shall be based on the latest ENERGY STAR specifications. Heating and cooling equipment should be sized according to ACCA Manual S specifications; ducts should be sized to Manual D specifications; both should be based on Manual J load calculations.
3. In homes with heat pumps, programmable thermostats must have "ramp-up" technology to prevent the excessive use of electric back-up heating.
4. In homes with oil or gas hydronic equipment, domestic water heating must be provided by the space heating boiler (tankless).
5. Ducts must be sealed and tested to 4 cfm to outdoors / 100 sq. ft. of conditioned floor area. Duct leakage must be determined and documented by a RESNET-certified rater using a RESNET-approved testing protocol.
6. To prevent condensation, a minimum of R-4 insulation is recommended for ducts in conditioned space.
7. Insulation shall meet the prescriptive requirements of the 2004 IECC table 402.1 or the U_o performance requirements of table 402.1.2.
8. Tested envelope leakage must be determined and documented by a RESNET-certified rater using a RESNET-approved testing protocol.
9. To ensure consistent exchange of indoor air, installation of a mechanical ventilation system that meets the minimum requirements of ASHRAE Standard 62.2 is recommended.
10. All items on the Thermal Bypass Inspection Checklist must be verified. The Checklist includes the following 12 areas:
 1. Shower/Tub at Exterior Wall
 2. Insulated Floor above Garage
 3. Attic Knee Walls
 4. Attic Hatch/Drop-down Stair
 5. Cantilevered Floor
 6. Duct Shafts
 7. Flue Shaft
 8. Piping Shaft/ Penetrations
 9. Dropped Ceiling/Soffit
 10. Fireplace Wall
 11. Staircase Framing at Exterior Wall/Attic
 12. Whole-house Fan Attic Penetration

APS Residential New Construction Program

11. The specifications for ENERGY STAR qualified windows can be found at www.energystar.gov. For homes with window area exceeding 21% window to floor area (WFA), the following additional requirements apply:

- a. In IECC Climate Zones 1, 2 and 3, an improved window Solar Heat Gain Coefficient (SHGC) is required and is determined by:

$$\text{Required SHGC} = [0.18 / \text{WFA}] * [\text{ENERGY STAR SHGC}]$$

Where the ENERGY STAR SHGC is the minimum required SHGC of a climate appropriate ENERGY STAR qualified window.

Note: Solar window screens may be used to meet required SHGC beyond the ENERGY STAR SHGC. The overall SHGC for a window unit with solar screen is determined by the following equation:

$$[(\text{window SHGC}) \times (\text{solar screen SHGC}) \times (\% \text{ area covered})] + [\text{window SHGC} \times \% \text{ area not covered}]$$

- b. In IECC Climate Zones 5, 6, 7 and 8, an improved window U-Value is required and is determined by:

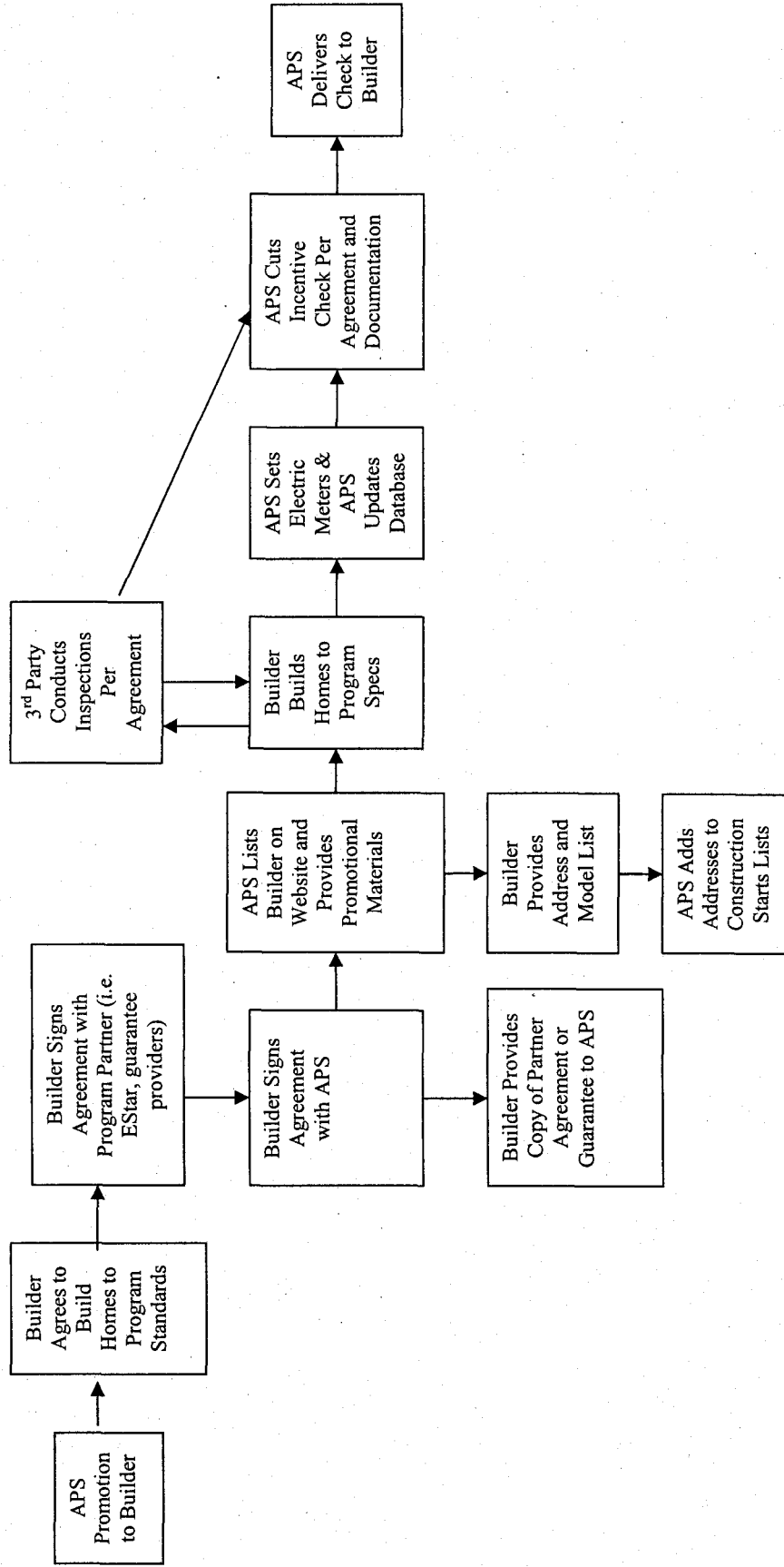
$$\text{Required U-Value} = [0.18 / \text{WFA}] * [\text{ENERGY STAR U-Value}]$$

Where the ENERGY STAR U-Value is the minimum required U-Value of a climate appropriate ENERGY STAR qualified window.

12. Any combination can be installed to meet this requirement. ENERGY STAR qualified lighting fixtures installed in the following locations can not be counted towards compliance with the ENERGY STAR reference home: storage rooms of any kind (e.g., closets, pantries, sheds), laundry rooms or garages. Additional efficiency and savings can be achieved by installing other ENERGY STAR qualified products throughout the house (e.g., additional lighting, appliances, etc.). For more information, visit www.energystar.gov.

13. EPA currently plans to require the ENERGY STAR Advanced Lighting Package (ALP) in 2009. To learn more, refer to the ALP quick link at www.energystar.gov/homes.

Appendix 2 – Residential New Construction Program Implementation Model



APS Residential New Construction Program

Appendix 3 – Program Costs

See accompanying Excel spreadsheet for 2005-2007 program budgets.

Appendix 3 - Residential New Construction Program - Projected Program Costs 2005

Program Activity	Plan & Admin	Program Marketing	Program Implement	Rebates & Incentives	Training & Tech Assist	Consumer Education	TOTAL	%
Realtor Advertising	5,000	50,000	8,000				\$63,000	5.4%
Building Science Training	10,000	10,000	15,000		25,000		\$60,000	5.1%
Builder Incentives	15,000	40,000	60,000	600,000			\$715,000	61.0%
Builder Co-Op Advertising	5,000	40,000	8,000				\$53,000	4.5%
Consumer Education	8,000		15,000			60,000	\$83,000	7.1%
Homebuyer Publications	5,000	18,000	8,000				\$31,000	2.6%
Builder promotion and awareness	9,000	15,000	80,000		20,000		\$124,000	10.6%
Realtor/Sales Agent Training	5,000	10,750	8,000		20,000		\$43,750	3.7%
TOTAL	\$62,000	\$183,750	\$202,000	\$600,000	\$65,000	\$60,000	\$1,172,750	
%	5.3%	15.7%	17.2%	51.2%	5.5%	5.1%		

Program Activities

Realtor advertising - Print and online advertising and program awareness building for realtor/sales agents

Building Science - Classes planned for fall 2005 targeted to builder construction staff and subcontractors, includes cost of expert trainer, classroom fees and APS planning, implementation and marketing

Builder incentives - Based on 1500 homes x \$400/home, includes cost to plan, promote and implement

Co-Op Advertising - Funds for builder advertising and marketing support for fall 2005.

Consumer Education - Homebuyer's guide promotion, energy cost brochures, events, etc. that are focused on general consumer education about energy efficient new home features and benefits.

Homebuyer publications - covers cost of existing and planned program marketing to prospective homebuyers.

Builder promotion - Includes 1 FTE (builder rep) and program support.

Realtor/sales agent training - energy efficiency sales training course, bldg science basics

Budget Allocation

Planning and Administration	Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor (where applicable), program development, program coordination, and general overhead expenses.
-----------------------------	--

Program Marketing	Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)
-------------------	---

Program Implementation	Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor (where applicable) and overhead costs as well as other direct program delivery costs. For this program, includes APS in-house labor for program implementation, including 1 FTE builder sales rep and associated support.
------------------------	---

Rebates and Incentives	Includes all dollars that go toward customer rebates and incentives.
------------------------	--

Training and Technical Assistance	Includes all dollars that are used for energy efficiency training and technical assistance for program participants (i.e. builders, contractors and realtors/sales agents)
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Consumer Education	Includes dollars that are used to support general consumer education about energy efficiency improvements.
--------------------	--

Appendix 3 - Residential New Construction Program - Projected Program Costs 2006

Program Activity	Plan & Admin	Program Marketing	Program Implement	Rebates & Incentives	Training & Tech Assist	Consumer Education	TOTAL	%
Realtor Advertising	7,500	70,000	20,000				\$97,500	4.6%
Building Science Training	15,000	25,000	40,000		60,000		\$140,000	6.6%
Builder Incentives	30,000	65,000	110,000	1,100,000			\$1,305,000	61.1%
Builder Co-Op Advertising	10,000	55,000	15,000				\$80,000	3.7%
Consumer Education	10,000		20,000			120,000	\$150,000	7.0%
Homebuyer Publications	8,000	40,000	15,000				\$63,000	2.9%
Builder promotion and awareness	20,000	45,000	125,000		21,000		\$211,000	9.9%
Realtor/Sales Agent Training	10,000	20,000	20,000		40,000		\$90,000	4.2%
TOTAL	\$110,500	\$320,000	\$365,000	\$1,100,000	\$121,000	\$120,000	\$2,136,500	
%	5.2%	15.0%	17.1%	51.5%	5.7%	5.6%		

Program Activities

Realtor advertising - Print and online advertising and program awareness building for realtor/sales agents

Building Science - Classes planned for 2006 targeted to builder construction staff and subcontractors, includes cost of expert trainer, classroom fees and APS planning, implementation and marketing

Builder incentives - Based on 2750 homes x \$400/home, includes cost to plan, promote and implement

Co-Op Advertising - Funds for builder advertising and marketing support.

Consumer Education - Homebuyer's guide promotion, energy cost brochures, events, etc. that are focused on general consumer education about energy efficient new home features and benefits.

Homebuyer publications - covers cost of existing and planned program marketing to prospective homebuyers.

Builder promotion - Includes 1 FTE (builder rep) and program support.

Realtor/sales agent training - energy efficiency sales training course, bldg science basics

Budget Allocation

Planning and Administration Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor (where applicable), program development, program coordination, and general overhead expenses.

Program Marketing Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)

Program Implementation Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor (where applicable) and overhead costs as well as other direct program delivery costs. For this program, includes APS in-house labor for program implementation, including 1 FTE builder sales rep and associated support.

Rebates and Incentives Includes all dollars that go toward customer rebates and incentives.

Training and Technical Assistance Includes all dollars that are used for energy efficiency training and technical assistance for program participants (i.e. builders, contractors and realtors/sales agents)

Consumer Education Includes dollars that are used to support general consumer education about energy efficiency improvements.

Appendix 3 - Residential New Construction Program - Projected Program Costs 2007

Program Activity	Plan & Admin	Program Marketing	Program Implement	Rebates & Incentives	Training & Tech Assist	Consumer Education	TOTAL	%
Realtor Advertising	10,013	75,000	20,000				\$105,013	3.6%
Building Science Training	10,000	30,000	40,000		60,000		\$140,000	4.9%
Builder Incentives	60,000	80,000	150,000	1,700,000			\$1,990,000	69.1%
Builder Co-Op Advertising	10,000	70,000	20,000				\$100,000	3.5%
Consumer Education	10,000		20,000			120,000	\$150,000	5.2%
Homebuyer Publications	10,000	45,000	10,000				\$65,000	2.3%
Builder promotion and awareness	20,000	50,000	150,000		20,000		\$240,000	8.3%
Realtor/Sales Agent Training	10,000	20,000	20,000		40,000		\$90,000	3.1%
TOTAL	\$140,013	\$370,000	\$430,000	\$1,700,000	\$120,000	\$120,000	\$2,880,013	
%	4.9%	12.8%	14.9%	59.0%	4.2%	4.2%		

Program Activities

Realtor marketing - Print and online advertising and program awareness building for realtor/sales agents

Building Science - Classes planned for 2007 targeted to builder construction staff and subcontractors, includes cost of expert trainer, classroom fees and APS planning, implementation and marketing

Builder incentives - Based on 4250 homes x \$400/home, includes cost to plan, promote and implement

Co-Op Advertising - Funds for builder advertising and marketing support.

Consumer Education - Homebuyer's guide promotion, energy cost brochures, events, etc. that are focused on general

Homebuyer publications - covers cost of existing and planned program marketing to prospective homebuyers.

Builder promotion - Includes 1 FTE (builder rep) and program support.

Realtor/sales agent training - energy efficiency sales training course, bldg science basics

Budget Allocation

Planning and Administration Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor (where applicable), program development, program coordination, and general overhead expenses.

Program Marketing Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)

Program Implementation Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor (where applicable) and overhead costs as well as other direct program delivery costs. For this program, includes APS in-house labor for program implementation, including 1 FTE builder sales rep and associated support.

Rebates and Incentives Includes all dollars that go toward customer rebates and incentives.

Training and Technical Assistance Includes all dollars that are used for energy efficiency training and technical assistance for program participants (i.e. builders, contractors and realtors/sales agents)

Consumer Education Includes dollars that are used to support general consumer education about energy efficiency improvements.

APS Residential New Construction Program

Appendix 4 – Energy Savings Calculations

See accompanying Excel spreadsheet for program energy savings calculations.

Appendix 4 - Residential New Construction Program - Energy Savings Calculations

[illegible]

Attachment 2

Residential Existing Homes AC Efficiency

Residential Existing Homes HVAC Efficiency Program

Program Concept and Description

- This program promotes a whole-system approach to improving the performance of residential heating, ventilating, and air conditioning (HVAC) systems through quality installation, maintenance and repair by qualified HVAC contractors.
- For equipment replacements, the program provides incentives for selection of high-efficiency heat pumps and AC systems, and quality installation practices.
- For equipment repairs, the program promotes home performance tests with associated system repairs, including sealing duct system leaks, refrigerant charging, and air balancing.
- For equipment maintenance, the program promotes seasonal equipment tune-ups by qualified contractors.
- The program will use EPA/DOE Energy Star® standards for equipment efficiency levels and quality installation practices. EPA/DOE is still in the process of finalizing the standard for quality installation practices; these standards will be incorporated into the program when they are adopted by Energy Star®.
- The program provides subsidies to support HVAC contractor technician training and enhances the existing Qualified Contractor Program which provides referrals to contractors who meet rigorous program training requirements.
- The program also provides consumer education on the benefits of quality HVAC installation and servicing by qualified technicians.

Target Market

- This program is targeted to APS residential customers (primarily single family homeowners) who are considering maintenance, repair, or replacement of their existing HVAC equipment.
- The program focuses on the Phoenix metro area where a significant pool of Qualified Contractors can be maintained. It will be expanded outside the metro area where feasible.
- It is estimated that in the Phoenix metro area, more than 60,000 HVAC units are replaced annually; approximately half of these in the APS service territory. This program will result in some early replacement of HVAC units, but the majority of HVAC equipment is typically replaced as a result of a major breakdown. This program will target the replacement market to ensure that replacements include high-efficiency equipment and quality installation. In addition, the program targets existing HVAC systems for repair and maintenance.

Current Baseline Conditions

- The average lifespan of residential HVAC equipment is listed by most manufacturers as between 12-15 years. It is estimated that the majority of equipment that will be replaced in this program will have rated efficiency of 8-10 SEER (typically 8 SEER or lower prior to 1992 and 10 SEER or higher since then). Actual field performance of this equipment is likely significantly lower than this due to age and maintenance level of existing equipment.
- For all HVAC units manufactured after January 1, 2006 the federal standard for minimum HVAC efficiency level will be 13 SEER. To achieve effective savings, this program will promote upgrades to higher SEER/EER levels (14 SEER/12 EER) with improved installation practices.
- The 1996 APS Proctor Study of Phoenix area homes and other national studies have indicated that there are significant opportunities to improve the energy efficiency of typical residential HVAC installations through proper equipment sizing, airflow and refrigerant charge adjustments, and duct system improvements.

Program Eligibility

- The program is available to all APS residential customers including both all-electric and dual fuel homes.
- The program is open to any HVAC contractor who meets program requirements and to any brand of HVAC equipment that meets EPA Energy Star® performance standards.

Program Rationale

- Significant savings can be achieved during HVAC system replacements by encouraging upgrades to high efficiency units and ensuring equipment is properly installed by a qualified technician. In addition,

Residential Existing Homes HVAC Efficiency Program

HVAC system repairs and maintenance can significantly increase the efficiency of existing residential HVAC systems.

Program Objectives

- Promote the purchase of high-efficiency HVAC equipment, particularly high EER equipment that performs well at high outdoor ambient temperatures over 100 degrees F.
- Promote quality HVAC system installation to maximize energy efficiency and comfort.
- Increase the availability of qualified professional HVAC contractors who are well-trained in techniques for diagnosing system performance problems and making system repairs and upgrades to maximize efficiency.
- Increase homeowners' awareness and knowledge of the benefits of properly installed high-efficiency HVAC systems.

Products and Services Provided

- Educational efforts targeted to homeowners about the benefits of high-efficiency HVAC systems through educational brochures, promotional material and website content.
- Training and qualification of HVAC contractors.
- Customer referrals to qualified professional contractors.
- Incentives as summarized in the table below. Each participating home is only eligible for one of the incentives shown below. Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.

Residential Existing Homes HVAC Efficiency Program Incentives

Measure Description	Technical Specification	Incentive
High SEER/EER Equipment	Tier 1 = ≥ 14 SEER/12 EER Tier 2 = ≥ 16 SEER/14 EER	\$250/unit \$400/unit
Quality Installation and High SEER/EER	Must meet EPA Energy Star quality installation standard (includes equipment sizing, airflow, and refrigerant charge)	\$500/unit
HVAC system testing and repair	Contractors must document home performance test and repairs using approved tools and methods. To receive incentive, contractor must show proof of efficiency improvement with before/after system efficiency tests.	\$250/unit

Delivery Strategy and Administration

- This program will be managed in house by APS.
- APS will provide program administration, marketing, planning and coordination of contractor training and education activities, customer participation tracking, quality control, and technical support. APS will work with trade partners and/or implementation contractors for some program activities such as incentive payment processing and fulfillment.
- Key partnering relationships include:
 - The Electric League of Arizona– Non-profit contractor association that provides management of the Qualified Contractor referral system and contractor training programs
 - National training/certification organizations – (i.e. Advanced Energy, NCI, NATE, BPI)
 - The Arizona Energy Office – assistance in training and contractor/consumer awareness
 - Energy Star/CEE – Certification of HVAC equipment efficiency and quality installations.

Marketing and Communications

- APS provides marketing and consumer awareness including bill stuffers, consumer education pieces, website content, media ads, promotion of the Energy Star label, and call center support.

Residential Existing Homes HVAC Efficiency Program

- The proposed marketing plan for this program will consist of the elements shown in the following table:

Marketing Channel/Target Market	Marketing Initiative
Contractors/Manufacturers	<ul style="list-style-type: none"> Contractor/manufacture trade associations. Leverage membership in the Electric League of Arizona. Direct selling with contractors, distributors, and manufacturer reps. HVAC trade shows Advertising and article placements in local HVAC industry publications Trade partnerships Qualified Contractor/advisory group meetings
Consumers	<ul style="list-style-type: none"> APS bill inserts and newsletters APS consumer brochures and consumer guides Leverage Energy Star and other consumer awareness programs Co-op advertising with contractors and AC manufacturers Southwestern Home Journal newspaper insert APS website Sales tools for participating contractors
Public Relations	<ul style="list-style-type: none"> Work with APS media relations team to secure article placements.

Program Implementation Schedule

- Continue existing APS Qualified Contractor Program and enhance the current program with additional program elements. Start offering incentives for high SEER/EER equipment in fall 2005 (pending program approval date). Phase-in HVAC quality installation requirements as soon as the EPA Energy Star quality installation standards become enacted.
- The following table shows the estimated timeline for key program activities by quarter.

Program Activity	Timeline											
	2005				2006				2007			
Continue ongoing QC program												
New program approval												
Contractor research (part of baseline study)												
Program development												
Marketing material creation												
Kick-off to target market and start of promotion												
Continuous program implementation												
1 st Spring promotion												
Process evaluation												
Savings verification												
Energy Star Quality Install Standard begins												

Monitoring and Evaluation Plan

- APS intends to use an independent third party evaluation contractor to conduct program evaluations.
- Prior to program implementation, APS will issue an RFP to retain an evaluation contractor. The evaluation contractor will then work directly with program implementation staff to ensure that program design and implementation activities will collect necessary data for monitoring and evaluation.
- The monitoring and evaluation strategy will involve integrated evaluation. In this approach, data (such as equipment SEER levels) is collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data collection at a lower cost.
- Participating HVAC contractors will be required to document all efficiency measures. Random field inspection and verification will be performed by an independent testing company with HVAC technical expertise.

Residential Existing Homes HVAC Efficiency Program

Program Costs

- Program budgets for program years 2005, 2006, and 2007 including planning and administration, program marketing, program implementation, rebates and incentives, training and technical assistance, and consumer education:
 - 2005: \$868,000
 - 2006: \$1,138,498
 - 2007: \$1,579,238
- See Appendix 2 for more information about program costs.

Estimated Energy Savings

- The following table shows estimated energy savings from each program measure. See Appendix 3 for more information.

Year	kW Peak Demand Savings	Lifetime kWh Savings*
2005	1128	47,433,600
2006	1500	62,243,700
2007	538	23,800,800
Program Total 2005-2007	3166	133,478,100

* Lifetime kWh savings refers to total energy savings over the expected life of the DSM measure installed in the year indicated.

Program Cost Effectiveness

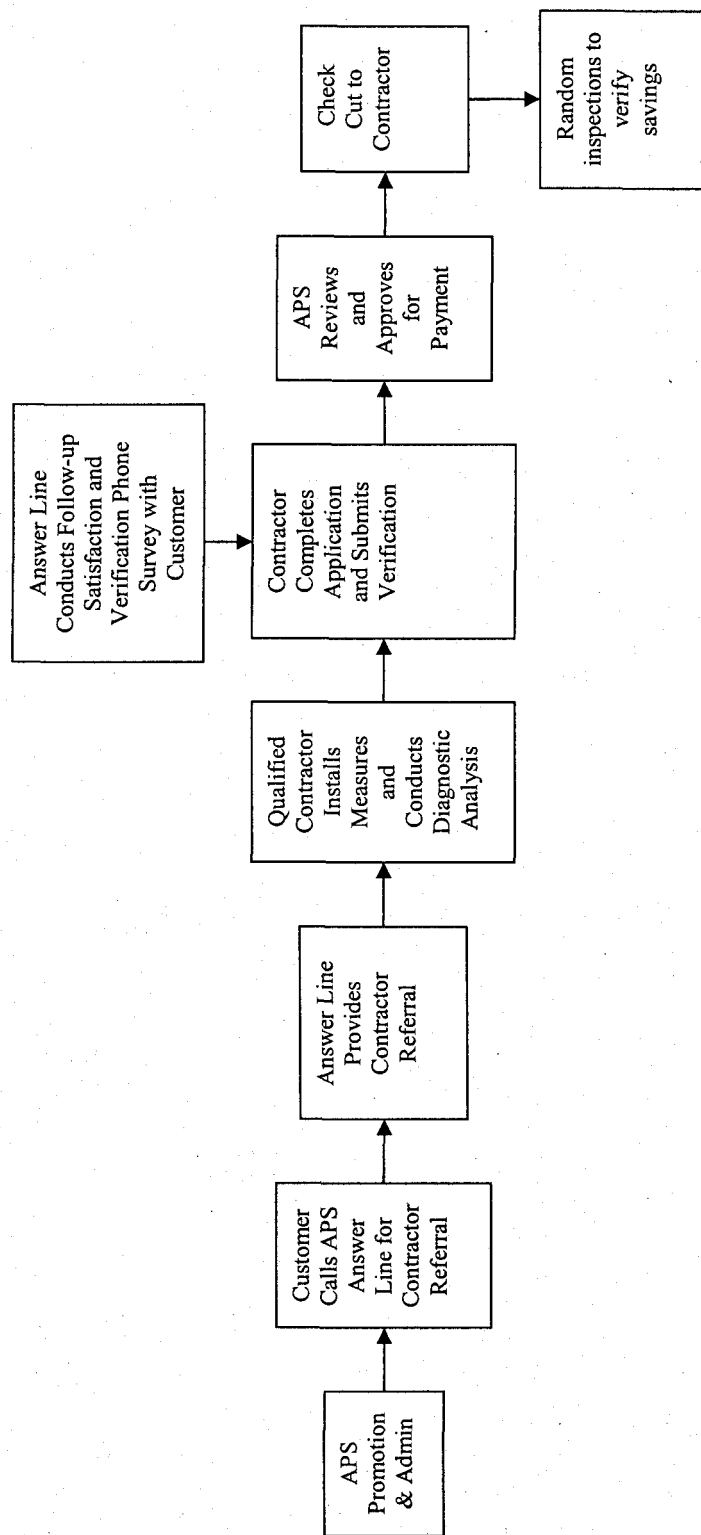
Total APS Program Cost 2005-2007	\$/Lifetime kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$3,585,736	\$.027	\$7,964,958	\$5,824,218	1.37

In addition to the savings shown above, it is estimated that the program will provide these additional benefits:

Water Savings	31,100,397 gallons
SOx	574 lbs.
NOx	22,958 lbs.
CO2	122,399,418 lbs.
PM10	3163 lbs.

Residential Existing Homes HVAC Efficiency Program

Appendix 1 - Residential Existing Homes HVAC Efficiency Program Implementation Model



Residential Existing Homes HVAC Efficiency Program

Appendix 2 – Program Costs

See accompanying Excel spreadsheet for 2005-2007 program budgets.

Appendix 2 - Residential Existing Homes HVAC Program - Projected Program Costs 2005

Program Activity	Plan & Admin	Program Marketing	Program Implement	Rebates & Incentives	Training and Tech Assist	Consumer Education	TOTAL	%
Energy Answer Line	5,000		35,000			30,000	\$70,000	8.1%
Southwestern Home Journal	5,000	30,000	10,000			30,000	\$75,000	8.6%
Consumer education	10,000		20,000			60,000	\$90,000	10.4%
High Efficiency Rebates	25,000	30,000	50,000	400,000	8,000		\$513,000	59.1%
Co-Op Advertising	5,000	35,000	10,000				\$50,000	5.8%
Contractor Training	10,000	5,000	10,000		45,000		\$70,000	8.1%
TOTAL	\$60,000	\$100,000	\$135,000	\$400,000	\$53,000	\$120,000	\$868,000	
%	6.9%	11.5%	15.6%	46.1%	6.1%	14%		

Program Activities

Energy Answer Line - Dedicated phone line for customers to call with questions about home energy efficiency and DSM programs. Used for consumer education and assists in program delivery.

Southwestern Home Journal - Quarterly eight page insert in Az Republic. Used for consumer education and program awareness (50/50%).

Consumer Education - HVAC Consumer's Guide promotion, on-line audit, consumer education events, etc. that are focused on general consumer education about energy efficient HVAC features and benefits.

High Efficiency Equipment Rebates - Rebates for high SEER/EER equipment

Co-Op Advertising - Funds for spring HVAC tune-up contractor co-op campaign, including \$ for APS oversight and implementation

Contractor training - Includes direct subsidies, marketing cost, and APS oversight and direct implementation

Budget Allocation

Planning and Administration Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor (where applicable), program development, program coordination, and general overhead expenses.

Program Marketing Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)

Program Implementation Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor (where applicable) and overhead costs as well as other direct program delivery costs. For this program, includes APS in-house labor for program implementation and associated support.

Rebates and Incentives Includes all dollars that go toward customer rebates and incentives.

Training and Technical Assistance Includes all dollars that are used for energy efficiency training and technical assistance for program participants (i.e. HVAC contractors)

Consumer Education Includes dollars that are used to support general consumer education about energy efficiency improvements.

Appendix 2 - Residential Existing Homes HVAC Program - Projected Program Costs 2006

Program Activity	Plan & Admin	Program Marketing	Program Implement	Rebates & Incentives	Training & Tech Assist	Consumer Education	TOTAL	%
Energy Answer Line	5,000		35,000			30,000	\$70,000	6.1%
Southwestern Home Journal	10,000	35,000	15,000			35,000	\$95,000	8.3%
Consumer education	10,000		30,000			105,000	\$145,000	12.7%
High efficiency rebates	20,000	40,000	52,000	520,000			\$632,000	55.5%
Co-Op Advertising	10,000	45,000	16,498				\$71,498	6.3%
Contractor Training	10,000	20,000	10,000		85,000		\$125,000	11.0%
TOTAL	\$65,000	\$140,000	\$158,498	\$520,000	\$85,000	\$170,000	\$1,138,498	
%	5.7%	12.3%	13.9%	45.7%	7.5%	15%		

Program Activities

Energy Answer Line - Dedicated phone line for customers to call with questions about home energy efficiency and DSM programs. Used for consumer education and assists in program delivery.

Southwestern Home Journal - Quarterly eight page insert in Az Republic. Used for consumer education and program awareness (50/50%).

Consumer Education - HVAC Consumer's Guide promotion, on-line audit, consumer education events, etc. that are focused on general consumer education about energy efficient HVAC features and benefits.

High Efficiency Equipment Rebates - Includes rebates for high SEER/EER equipment replacements and HVAC performance testing and associated system repairs.

Co-Op Advertising - Funds for contractor/manufacture co-op advertising campaigns

Contractor training - Includes direct subsidies, marketing cost, and APS oversight and implementation

Budget Allocation

Planning and Administration Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor (where applicable), program development, program

Program Marketing Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)

Program Implementation Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor (where applicable) and overhead costs as well as other direct program delivery costs. For this program, includes APS in-house labor for program implementation and associated support.

Rebates and Incentives Includes all dollars that go toward customer rebates and incentives.

Training and Technical Assistance Includes all dollars that are used for energy efficiency training and technical assistance for program participants (i.e. HVAC contractors)

Consumer Education Includes dollars that are used to support general consumer education about energy efficiency improvements.

Appendix 2 - Residential Existing Homes HVAC Program - Projected Program Costs 2007

Program Activity	Plan & Admin	Program Marketing	Program Implement	Rebates & Incentives	Training and Tech Assist	Consumer Education	TOTAL	%
Energy Answer Line	5,000		35,000			30,000	\$70,000	4.4%
Southwestern Home Journal	5,000	44,238	15,000			40,000	\$104,238	6.6%
Consumer education	15,000		50,000			160,000	\$225,000	14.2%
High Efficiency Rebates	40,000	50,000	80,000	700,000		20,000	\$890,000	56.4%
Co-Op Advertising	10,000	50,000	25,000				\$85,000	5.4%
Contractor Training	20,000	10,000	20,000		155,000		\$205,000	13.0%
TOTAL	\$95,000	\$154,238	\$225,000	\$700,000	\$155,000	\$250,000	\$1,579,238	
%	6.0%	9.8%	14.2%	44.3%	9.8%	15.8%		

Program Activities

Energy Answer Line - Dedicated phone line for customers to call with questions about home energy efficiency and DSM programs. Used for consumer education and assists in program delivery.

Southwestern Home Journal - Quarterly eight page insert in Az Republic. Used for consumer education and program awareness (50/50%).

Consumer Education - HVAC Consumer's Guide promotion, on-line audit, consumer education events, etc. that are focused on general consumer education about energy efficient HVAC features and benefits.

High Efficiency Equipment Rebates - Includes rebates for high SEER/EER equipment replacements, quality installation and HVAC performance testing and associated system repairs.

Co-Op Advertising - Funds for contractor/manufacture co-op advertising campaigns

Contractor training - Includes direct subsidies, marketing cost, and APS oversight and implementation

Budget Allocation

Planning and Administration Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor (where applicable), program development, program coordination, and general overhead expenses.

Program Marketing Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)

Program Implementation Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor (where applicable) and overhead costs as well as other direct program delivery costs. For this program, includes APS in-house labor for program implementation and associated support.

Rebates and Incentives Includes all dollars that go toward customer rebates and incentives.

Training and Technical Assistance Includes all dollars that are used for energy efficiency training and technical assistance for program participants (i.e. HVAC contractors)

Consumer Education Includes dollars that are used to support general consumer education about energy efficiency improvements.

Residential Existing Homes HVAC Efficiency Program

Appendix 3 – Energy Savings Calculations

See accompanying Excel spreadsheet for program energy savings calculations.

Appendix 3 - Residential Existing Homes HVAC Program - Energy Savings Calculations

Measure	Peak Demand kW savings per ton	Peak Coincidence and Load Factor	Annual Energy kWh savings per ton	Ave Tons per Unit	# unit 2005	# unit 2006	# unit 2007	NTG Adjust Factor	TOTAL kW 05	TOTAL kW 06	TOTAL kW 07	TOTAL KW Savings 05-07	Meas. life	TOTAL Lifetime kWh 05	TOTAL Lifetime kWh 06	TOTAL Lifetime kWh 07	TOTAL Lifetime kWh savings
High SEER/EER*	0.339	0.77	732	4	1350	1650	0	0.8	1127.65	1378	0	2505.89	15	47,433,600	57,974,400	0	105,408,000
High EER Quality Install**	0.12	0.77	292	4	0	0	1200	0.9	0	0	399,168	399,168	15	0	0	18,921,600	18,921,600
HVAC Diagnostic	0.119	0.77	321	4	0	350	400	0.95	0	121,868	139,278	261,146	10	0	4,269,300	4,879,200	9,148,500
TOTAL ALL MEASURES					1350	2000	1600		1,127.6	1,500.1	538.4	3,166.2		47,433,600	62,243,700	23,800,800	133,478,100

*Compares 14 SEER to 11 SEER, assumes standard installation practices, used in calcs for 2005-06 program measures.

**Compares 14 SEER to 13 SEER and includes savings from quality installation (proper sizing, airflow, refrigerant charge, sealed ducts). Used in calcs for 2007 program based on EPA Energy Star® proposed quality installation standard.

Where:

Column A = DSM Measure

Column B = kW peak demand savings per unit

Column C = Peak coincidence - APS and Summit Blue consulting analysis

Column D = Annual kWh savings per unit

Columns E-G = APS estimates of # units each year. All estimates will be updated with results from the APS market potential study.

Column H = Net to gross adjustment factor

Columns I-L = total kW demand savings estimate

Column L = Measure life

Column N-Q = Estimated lifetime kWh energy savings over the expected life of all measures.

Attachment 3

Residential Consumer Products

High-Efficiency Consumer Products Program

Program Concept and Description

- This program promotes high-efficiency EPA/DOE Energy Star® approved lighting and appliances. Qualified products include Energy Star® clothes washers, refrigerators and freezers, dishwashers and Compact Fluorescent Lamps (CFL's). Clothes dryers are not included. There is currently no Energy Star® designation for dryers because there is very little difference in the energy usage of different models and brands of dryers.
- The program will solicit discount pricing from manufacturers (upstream buy-down) and distribution of CFL's through local retailers. Discount pricing from manufacturers will be established through a bid process. Customers will be referred to participating retailers (i.e. home improvement, lighting stores, and department stores) to purchase qualifying products. Discount pricing will be passed on to consumers through a negotiated agreement with lighting manufacturers and retailers.
- The program provides consumer education and promotion of Energy Star® rated lighting and appliances through APS promotions, vendor advertising and point-of-sale displays.
- Other delivery channels may be used as necessary to increase consumer awareness and promote qualifying products; including special promotional events and CFL giveaways.
- The program provides sales training for participating retailers to help them promote energy efficient products.

Target Market

- The primary target market is APS residential customers who are looking to purchase new/replacement appliances or lighting.
- This program will be implemented within the APS service territory where participating retailers can be located.
- As a secondary target, small business customers may also take advantage of discount prices on qualifying products subject.
- See Appendix 1 for more information about the target market and current baseline conditions.

Current Baseline Conditions

- According to EPA/DOE information, the following market penetrations represent the current baseline conditions for Energy Star® appliances in Arizona (based on 2005 information from Energy Star).
 - Refrigerators 40.82%
 - Clothes Washers 28.39%
 - Dishwashers 91.72%
- EPA reports that nationally approximately 35,435,000 Energy Star® approved CFL's were sold in 2003. No market specific data on CFL sales is currently available. However, there is some indication that the current market penetration for CFL's in Arizona is relatively low. In addition, some CFL's currently being stocked and sold in Arizona are not Energy Star® approved. Many of these lamps are inferior products with shorter life spans than Energy Star® approved CFL's. These assumptions about the current market will be confirmed by the DSM baseline and market potential study.

Program Eligibility

- The program is available to all APS residential customers. It is anticipated that some small business customers will also take advantage of lighting product discounts.
- The program will be targeted to reach APS customers; however, because of proximity to other utility service territories, it will not be possible to make this program completely exclusive to APS customers. When possible, APS will attempt to coordinate efforts with other local utilities and organizations. In addition, APS will employ program delivery strategies that limit participation by non-APS customers.
- The program will limit purchases of discounted lighting products to no more than 10 bulbs per customer.

Program Rationale

- The rationale for offering this program is that consumer appliances and lighting represent a significant portion of total APS energy consumption. For the typical household in the Phoenix metro area, the combination of lighting, refrigerators, clothes washers, and dishwashers represents as much as 15% of typical annual energy costs. When consumers are in the market to replace their lighting and appliances, a significant opportunity exists to help save energy for the lifetime of these appliances by encouraging consumers to purchase the most energy efficient products that are available.

High-Efficiency Consumer Products Program

- Program design that works directly with manufacturers and retailers to buy down the cost of energy efficient consumer products at the wholesale level has been highly successful in other utility programs and it increases program cost effectiveness as compared to other program delivery strategies.

Program Objectives

- Promote the purchase of high-efficiency appliances and compact fluorescent lamps.
- Increase the availability of Energy Star® rated products in the marketplace.
- Increase the awareness and knowledge of retailers and consumers on the benefits of Energy Star® rated appliances and lighting.

Products and Services Provided

- Discount pricing of qualified Energy Star® compact fluorescent lamps.
- Education and promotional efforts aimed at retailers and consumers about the benefits of Energy Star® rated appliances and lighting through educational brochures, program promotional material, point-of-sale displays, and website content.
- Customer referrals to participating retail stores.

Delivery Strategy and Administration

- This program will be implemented by a third party implementation contractor.
- The implementation contractor will be responsible for soliciting discount pricing from manufacturers, identifying and coordinating selected retail outlets, training retailer sales/management staff, tracking program progress, and reporting to APS.
- APS will provide overall program administration, marketing, quality control monitoring, and technical support.
- Key partnering relationships include:
 - Manufacturers— negotiating discount pricing with manufacturers is a key component of the program
 - Appliance and Lighting Retailers – retail outlets display, promote and sell qualified products, and pass discount pricing on to consumer
 - Utilities and other organizations – where feasible, explore partnerships to coordinate efforts.
- APS will issue an RFP to lighting manufacturers to solicit their participation in this program. Manufacturers will work directly with their retailers to establish coordinated efforts. Only retail outlets that are in the APS service area will be eligible to participate.
- Appendix 2 provides a basic flow chart that outlines the anticipated program delivery.

Marketing and Communications

- APS provides program marketing and customer awareness including bill stuffers, consumer education pieces, website content, media ads, promotion of the Energy Star® label, etc.
- Implementation contractor assists with general marketing to customers in conjunction with APS marketing staff, coordinates point-of-sale marketing campaign through the select network of manufacturers and retail outlets, helps field customer inquiries, and promotes products and services.
- To limit the amount of participation from customers who are not served by APS, marketing for this program will target APS customers to the fullest extent possible. APS delivery channels including bill inserts, newsletters, APS website, and e-mail newsletters will be used to maximize exposure and awareness for APS customers.
- The proposed marketing plan for this program will consist of the elements shown in the following table:

High-Efficiency Consumer Products Program

Marketing Channel/Target Market	Marketing Initiative
APS Consumer Materials	<ul style="list-style-type: none"> • APS bill inserts, newsletter articles and/or bill messaging promoting special pricing events. Educational content about benefits. • APS website content about the benefits of purchasing high efficiency lighting and appliances and website features to promote special pricing events. • Feature articles in the Southwestern Home Journal special insert in the Arizona Republic delivered to Phoenix metro area homeowners within the APS service area.
Manufacturer/Retailer Advertising	<ul style="list-style-type: none"> • As part of buy-down program, leverage space in local retailer newspaper ads and other advertising media to promote special pricing for qualifying energy efficient products. Target to APS areas only when possible.
Point of Sale	<ul style="list-style-type: none"> • APS and implementation contractor work directly with manufacturers and retailers to feature special aisle end displays, signage, brochures and other point of sale displays to promote benefits of high efficiency appliances and advertise special pricing offers. • Implementation contractor conducts sales training for retail sales and management staff including sales tools that help sell the features and benefits of energy efficient products. • Special events and promotions to increase awareness and demand.
Public Relations	<ul style="list-style-type: none"> • Work with APS media relations team to secure free article placements.

High-Efficiency Consumer Products Program

Program Implementation Schedule

- The following table shows the estimated timeline for key program activities by quarter.

Program Activity	Timeline											
	2005				2006				2007			
Program submitted for approval												
Program approval (estimated)												
RFP process to select implementation vendor												
RFP issued to lighting manufacturers												
Final program development												
Marketing material creation												
Kick-off to target market/begin marketing activity												
Process evaluation												
Savings verification/Impact evaluation												
Program redesign as needed												

Monitoring and Evaluation Plan

- APS intends to use an independent third party evaluation contractor to conduct program evaluations.
- Prior to program implementation, APS will issue an RFP to retain an evaluation contractor. The evaluation contractor will then work directly with APS and the implementation contractor to ensure that program design and implementation activities will collect the necessary data for monitoring and evaluation.
- The strategy for monitoring and evaluation will involve integrated evaluation. In this approach, data are collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data collection at a lower cost.
- For evaluation of the effectiveness of the CFL retail buy-down strategy, APS will work with retail partners to track store level sales data of qualifying vs. non-qualifying products. Sales during the promotional period will be compared to typical sales (prior month, prior year) to establish the incremental sales that result from the DSM program.
- In addition, APS will track the market transformation effect of the program by utilizing Energy Star® appliance sales penetration data and other sales tracking data to measure product penetration compared to pre-program baseline levels, including ongoing monitoring of the amount of shelf space devoted to Energy Star® approved lighting and appliances.

Program Costs

- Program costs for program years 2005, 2006, and 2007 including program planning and administration, program implementation, customer incentives, education and training, and program awareness and marketing, are as follows:
 - 2005: \$1.9 million
 - 2006: \$1.825 million
 - 2007: \$1.8 million
- See Appendix 3 for more information about program costs.

Estimated Energy Savings

- The table below shows estimated program energy savings. See Appendix 4 for more information.

Year	Annual Peak kW Demand Savings	Lifetime kWh Savings*
2005	4556	160,593,312
2006	4583	166,380,192
2007	4610	172,179,072
Program Total 2005-2007	13,749	499,152,576

* Lifetime kWh savings refers to total energy savings over the expected life of the DSM measure.

High-Efficiency Consumer Products Program

Program Cost Effectiveness

Total APS Program Cost 2005-2007	\$/Lifetime kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$5,525,000	\$.011	\$23,121,222	\$8,977,672	2.58

In addition to the savings shown above, it is estimated that the program will produce these additional benefits:

Natural Gas Savings*	830,832 therms
Water Savings**	769,301,717 gallons
SOx	2146 lbs.
NOx	85,854 lbs.
CO2	457,719,633 lbs.
PM10	11,830 lbs.

* Natural gas savings result from hot water saved in homes with gas water heaters. Natural gas savings are provided consistent with the Cost Effectiveness section in staff's first draft of proposed DSM rules (Docket# RE-00000C-05-0230).

** Total water savings including both utility and customer water savings.

High-Efficiency Consumer Products Program

APPENDIX 1 –

Information about the target market and current baseline conditions

Market Size Estimates

Dishwashers

859,000 existing residential customers (687,000 low country, 172,000 high country) x product saturation (49% high country, 71% low country)¹ =

572,050 dishwashers in existing homes in the APS service area
(487,770 low country, 84,280 high country)²

572,050 dishwashers ÷ 12 year average product lifetime =
47,670 estimate of total annual replacement market³

Homes with electric water heating = 51%⁴
(weighted average saturation including high/low country)

Each 1% additional penetration (of total replacement market) =
477 dishwashers

Current baseline = 91.72% sales penetration⁵
End of 2005 – 93.72% penetration = 954 dishwasher upgrades
2006 – 95.72% penetration = 1908 dishwasher upgrades
2007 – 97.72% penetration = 2862 dishwasher upgrades
Total 2005-2007 = 5724 dishwasher upgrades

Homes with electric water heating =

2005 = 954 total upgrades x 51% = 487 dishwasher upgrades of homes with electric hot water
2006 = 1908 total upgrades x 51% = 973
2007 = 2862 total upgrades x 51% = 1460
Total 2005-2007 dishwasher upgrades with electric hot water savings = 2920

Homes with natural gas water heating =

2005 = 954 total upgrades x 49% = 467 dishwasher upgrades of homes with gas hot water
2006 = 1908 total upgrades x 49% = 935
2007 = 2862 total upgrades x 49% = 1402
Total 2005-2007 dishwasher upgrades with natural gas hot water savings = 2804

Clothes Washers

859,000 Existing residential customers (687,000 low country, 172,000 high country) x product saturation (83% low country, 78% high country)¹ =
704,370 total clothes washers in existing homes²

Total existing washers ÷ Average product lifetime (12 years) = estimate of total annual replacement market = 58,698³

Homes with electric water heating = 51%
(weighted average saturation including high/low country)⁴

Each 1% additional penetration (of total replacement market) = 587 clothes washers

High-Efficiency Consumer Products Program

Current baseline = 28.39% sales penetration⁵
End of 2005 – 30.39% penetration = 1174 clothes washer upgrades
2006 – 32.39% penetration = 2348 clothes washer upgrades
2007 – 34.39% penetration = 3522 clothes washer upgrades
Total 2005-2007 = 7044 clothes washer upgrades

Homes with electric water heating =

2005 = 1174 total upgrades x 51% = 599 washer upgrades in homes with electric hot water
2006 = 2348 total upgrades x 51% = 1197
2007 = 3522 total upgrades x 51% = 1797
Total 2005-2007 clothes washer upgrades with electric hot water savings = 3593

Homes with natural gas water heating =

2005 = 1174 total upgrades x 49% = 575 washer upgrades in homes with gas hot water
2006 = 2348 total upgrades x 49% = 1151
2007 = 3522 total upgrades x 49% = 1725
Total 2005-2007 clothes washer upgrades with natural gas hot water savings = 3451

Refrigerators

(859,000 existing residential customers) x (99% product saturation high and low country)¹ = 850,410
792,000 refrigerators in existing homes in the APS service area²

Total existing refrigerators (850,410) ÷ 18 year average product lifetime = estimate of total annual replacement market = 47,245³

Each 1% additional penetration = 472 refrigerators

Current baseline = 40.82% sales penetration⁵
2005 – 42.82% penetration = 944 refrigerator upgrades
2006 – 44.82% penetration = 1888 refrigerator upgrades
2007 – 46.82% penetration = 2832 refrigerator upgrades
Total 2005-2007 = 5664 refrigerator upgrades

Freezers

(859,000 existing residential customers) x (26% product saturation low country, 44% high country)¹ = 254,300 freezers in existing homes in the APS service area²

Total existing freezers (254,300) ÷ 18 year average product lifetime = estimate of total annual replacement market = 14,128³

Each 1% additional penetration = 141 freezers

Current baseline = 40.82% sales penetration⁵
2005 – 42.82% penetration = 282 freezer upgrades
2006 – 44.82% penetration = 564 freezer upgrades
2007 – 46.82% penetration = 846 freezer upgrades
Total 2005-2007 = 1692 freezer upgrades

High-Efficiency Consumer Products Program

Lighting

- 800,000 residential customers x 8 high use bulbs/household
= 6.4 million bulbs
- Subtract 30% adjustment factor
(estimate of non-market participants - i.e. existing CFL's, don't like CFL's, don't fit, etc.)
= 4.48 million bulbs
- Subtract 50% assuming that half of these high use bulbs are replaced each year
= 2.24 million bulbs/year = Total annual market potential³

Assumed market penetration each year =

2005

- assume program starts 3rd quarter = 1.12 million total market potential for 2nd half of 2005
- assume 50% penetration, limited time in market for 2005 = 500,000-700,000⁶ CFL's

2006 - 50% penetration = 1 million – 1.2 million CFL's

2007 - 50% penetration = 1 million – 1.2 million CFL's

¹ Appliance saturation information from APS 2001 Residential Appliance Saturation Study

² This analysis uses only existing residential customers because energy efficient appliances for new homes are being covered by the Residential New Construction program.

³ This is an estimate at this point which will be confirmed by the baseline and market potential study.

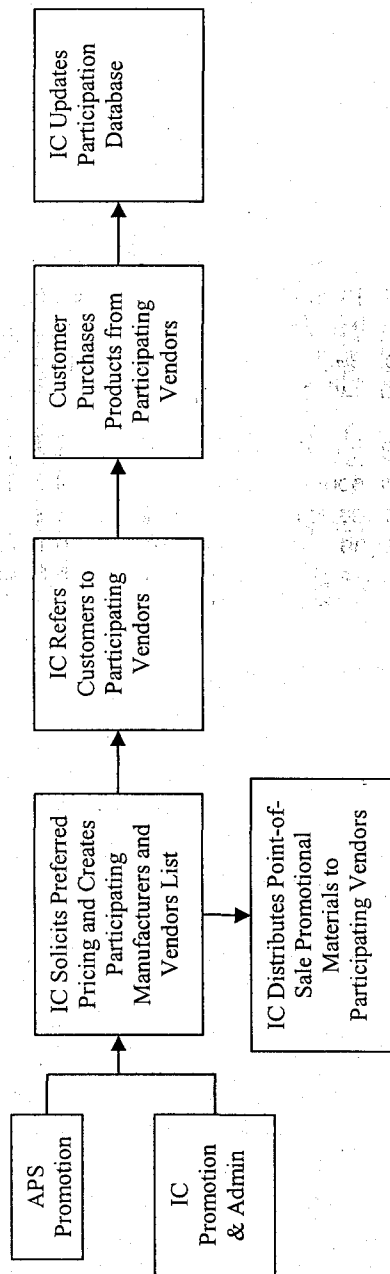
⁴ The vast majority of savings from Energy Star® dishwashers and clothes washers is a result of reduced hot water use, so this factor accounts for current saturation of electric water heating. For homes with gas water heating, savings are shown in terms of natural gas. Appliance saturation information is from the APS 2001 Residential Appliance Saturation Study.

⁵ Energy Star® penetration estimate was provided by Energy Star® program administrators based on current Energy Star® sales penetration data for Arizona. Estimate of a 2% penetration increase per year of program implementation is from Energy Star® and is based on experience from program implementation in other markets.

⁶ The estimated potential of 500,000-700,000 CFL sales for fall 2005 has been confirmed through discussion with lighting manufacturers, Energy Star® representatives, and the DSM collaborative.

Appendix 2

High Efficiency Home Products Program Implementation Model



IC = Implementation Contractor

APPENDIX 3 – Program Costs

See accompanying Excel spreadsheet
for 2005-2007 program budgets

Appendix 3 - Consumer Products Program - Projected Program Costs 2005

[illegible]

Appendix 3 - Consumer Products Program - Projected Program Costs 2006

[illegible]

Appendix 3 - Consumer Products Program - Projected Program Costs 2007	
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Program Area	Program Activity	Plan & Admin	Program Implement	Incentives	Education & training	Program awareness	TOTAL	%
Lighting	Retail buy-down program	30,000	80,000	1,000,000	20,000	75,000	\$1,205,000	66.9%
	Retail point of sale education	10,000	50,000		25,000	25,000	\$110,000	6.1%
	Consumer education	20,000	35,000		35,000	25,000	\$115,000	6.4%
	Special events, CFL giveaways	10,000	35,000	100,000	10,000	10,000	\$165,000	9.2%
	Co-Op Advertising	10,000	25,000			50,000	\$85,000	4.7%
	TOTAL	\$90,000	\$265,000	\$1,100,000	\$120,000	\$225,000	\$1,800,000	
	%	5%	15%	61%	7%	13%		
Lighting								
Retail Buydown	APS will issue RFP to lighting manufacturers. Based on buydown of approximately 570,000 CFL bulbs for \$1.75 each.							
Retail Point of Sale Consumer Education and Awareness	Support for retail lighting program, includes working with retailers for point of sale education and displays and coordinating retailer participation in the retail buydown program. Program marketing and educational efforts targeted to APS customers to promote the value of energy efficient lighting.							
Special events, CFL giveaways	Special events in fall 2007 to coordinate with national EPA campaign. Program kick-off and demo/education events to coordinate with retail buydown program. Incentive cost based on purchase of 30,000 bulbs for giveaways to increase awareness of CFL's.							
Co-Op Advertising	A co-op advertising budget will be included in the lighting buydown RFP. It will be available to lighting manufacturers and retailers who participate in the buydown program							
Appliances								
Retail point of sale Consumer Education and Awareness	Support for in-store promotion of qualifying Energy Star appliances, including retailer training and point of sale signage and consumer education pieces. Program marketing and educational efforts targeted to APS customers to promote the value of energy efficient appliances.							
Cost Allocation								
Planning and Administration	Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses							
Program Implementation	Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs. Includes all dollars that go toward customer incentives. For lighting measures, this includes the retail buydown expense for CFL's and cost of CFL giveaway bulbs. For appliances, the program design does not provide direct incentives to customers.							
Customer Incentives								
Education and Training	Includes all dollars that are used to support training for retail program partners. Also includes dollars that will be used for general consumer education about energy efficient lighting and appliances (i.e. provides some support for APS customer information tools such as the EnergyGuide on-line audit).							
Program Awareness	Includes all expenses related to marketing the program and increasing consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).							

Appendix 4 – Energy Savings Calculations
**See accompanying Excel spreadsheet for
program energy saving calculations**

Appendix 4 - Consumer Products Program - Energy Savings Calculations

Measure	Demand savings per unit	Peak Coincidence Factor	Annual Energy savings per unit	# unit 2005	# unit 2006	# unit 2007	Adjustment Factor	TOTAL kW 05	TOTAL kW 06	TOTAL kW 07	TOTAL Savings kW 05-07	Meas. life 05	TOTAL Lifetime kWh 06	TOTAL Lifetime kWh 07	TOTAL Lifetime kWh savings 05-07	Total Program Cost 2005-2007 kWh	Total Units 2005-2007
Clothes Washer	0.193	0.18	464	599	1197	1797	1.00	20.8	41.6	62.4	124.8	12	3,335,232	6,664,896	10,005,696	20,005,824	3593
Dishwasher	0.023	0.18	72	487	973	1460	1.00	2.0	4.0	6.0	12.1	12	420,768	840,672	1,261,440	2,522,880	2920
Refrigerator	0.01	0.35	96	944	1888	2832	1.00	3.3	6.6	9.9	19.8	18	1,631,232	3,262,464	4,893,696	9,787,392	5664
Freezer	0.01	0.35	80	282	564	846	1.00	1.0	2.0	3.0	5.9	18	406,080	812,160	1,218,240	2,436,480	
CFL Lighting	0.074	0.17	86	600,000	600,000	600,000	0.60	4528.80	4528.8	4528.8	13586.4	5	154,800,000	154,800,000	154,800,000	464,400,000	1,800,000
TOTAL APPLIANCES ONLY				2,030	4,058	6,089											
TOTAL ALL MEASURES				602,312	604,622	606,935		4,555.9	4,583.0	4,610.1	13,749.1		160,593,312	166,380,192	172,179,072	499,152,576	\$5,525,000 \$0.011

Where:

Column A = DSM measure

Column B = kW savings - from DEER database and EPA/DOE information

Column C = Peak coincidence - APS and Summit Blue Consulting analysis

Column D = kWh savings/unit = from DEER database and EPA/DOE Energy Star information

Columns E-G = APS estimates of # units each year (see program pre-approval document appendix 1 for more information. For dishwashers and clothes washers, this only includes homes with electric water heating (because the vast majority of savings are due to reduced hot water use).

Therm savings from homes with gas water heating are shown in the additional benefits chart in the cost effectiveness section of the program description. All estimates will be updated by the APS market potential study.

Cells F8&G8 Note that the number of 600,000 annual CFL units for 2006-7 is based on the current annual budgeted amount of \$1.1 million in incentives for the buydown program. It is estimated that the market potential for each year is greater than 600,000 CFL's.

Column H = Adjustment Factor = For CFL's, total savings are adjusted to account for 40% leakage of CFL bulbs into other utility service areas. For appliances, no adjustment is needed.

Columns I-L = Total kW demand savings estimate

Column M = Measure life - based on DEER database and EPA/DOE Energy Star information

Columns N-Q = Estimated lifetime kWh energy savings over the expected life of the measures.

Attachment 4

Energy Wise Low Income Weatherization Program

APS Energy Wise Low Income Weatherization Program

Program Concept and Description

- This program is an expansion and modification of the current program which has been in place since 1996. It is composed of four parts.
- 1. Weatherization: Provides low income residential customers with both an assessment of the feasibility of improving the energy efficiency of their homes and the installation of energy efficiency measures. Weatherization requires an assessment of the structure and appliances as appropriate to determine what cost effective measures are needed.

The weatherization portion of the program will be conducted in accordance with the rules of the Weatherization Assistance Program (WAP) ⁽¹⁾ as interpreted by the Arizona Department of Commerce Energy Office (Energy Office) with the exceptions noted below.

The APS program is conducted in accordance with WAP rules, and APS funds are often leveraged with other fund sources. The APS program is independent of WAP.

See Appendix 3 for details of the WAP program.

(1) The Weatherization Assistance Program is funded by the U.S. Department of Energy (DOE) and administered by the Arizona Department of Commerce Energy Office (Energy Office). It enables low-income families to permanently reduce their energy bills by making their homes more energy efficient. It is this country's longest running, and perhaps most successful energy efficiency program. During the last 27 years, the program has provided weatherization services to more than 5.3 million low-income families. By reducing the energy bills of low-income families, weatherization liberates these funds for spending on pressing family needs such as medical prescriptions.

Exceptions to WAP rules:

- Weatherization measures will be limited to those that conserve primarily electric energy.
 - Waivers for exceptions in special cases will be subject to approval by APS.
 - General repairs may also be done, providing that the entire project is cost effective.
 - This category may include: repairs to membranes to stop roof leaks, repairs to or replacement of non-repairable window units; repairs to or replacement of non-repairable exterior doors; restoration/replacement of ceiling areas which cannot support ceiling insulation; and restoration/replacement of floor areas over "crawl spaces" which are not structurally strong enough to remain part of the building "envelope".
 - The maximum expenditure per home in a 12 month period for Weatherization, Repair/Replacement, Health and Safety combined is \$6,000.
2. Health and Safety: Pays for energy efficient window unit air conditioners and heat pumps that are prescribed by a Medical Doctor.
3. Repair and replacement:

This service is crisis related. The service provides for repair or replacement of an existing utility related appliance/system. Appliances are replaced only when repair costs would exceed replacement costs or when an appliance would be inoperable or unsafe even with repairs.

The work performed and any appliances/systems are guaranteed.
The program does not provide for maintenance of these appliances/systems.

If the property is a rental, the structurally attached appliances or systems (i.e. evaporative cooler, water lines, etc.) are not eligible for this service. These are the financial responsibility of the property owner.

List of Acceptable verifications of ownership of appliance and/or system:

Homeowner: Deed, Title, Property Tax Statement

Renter: Receipt of purchase of the specific appliance; or notarized affidavit signed by landlord confirming that client is owner of the specific appliance (with serial number noted) **AND** proof that the landlord is the owner of the rental property (deed, title, property tax statement)

APS Energy Wise Low Income Weatherization Program

4. Bill assistance: Bill assistance can be used to pay electric bills for customers in crisis situations. A household may receive assistance once in a 12 month period for a maximum of \$400. Three categories of Crisis as defined by Arizona Department of Economic Security/Community Services Division are: 1) loss or reduction of income, 2) unexpected or unplanned expenses that caused lack of resources, 3) a condition that endangers the health or safety of the household.

Target Market and Current Baseline Conditions

- The program is available to all income qualified APS residential electric customers who are responsible for paying the electric bill.
- Estimates based on census data indicate that there are between 135,000 and 180,000 customers in the target market.

Program Eligibility

- Be an APS residential customer with a household income less than or equal to 150% of the federal poverty guidelines and be responsible for paying the electric bill.
- Customers living in rented homes are eligible for weatherization services only with the owner's written approval. Owners must agree to not increase the rent for 12 months.
- Special weatherization projects for master metered and/or multifamily housing will be considered by APS on a case by case basis.

Program Rationale

- Low income households spend a high proportion of their total income for energy. This program will help to reduce energy costs, making funds available for other necessities.

Program Objectives

- The long term goal is to help low income customers become self sufficient by assisting them in reducing their energy bills.
- To substantially increase the number of homes served and approximately double the amount of electricity saved. APS has historically provided weatherization services to an average of 514 customers a year.
- To provide bill assistance to at least 625 customers per year.

Products and Services Provided

- The program provides an on-site audit for customers accepted for consideration for weatherization services. It may provide installation of a variety of energy efficiency measures identified by WAP as interpreted by the Energy Office. In general, these may include energy efficient measures to the structure or appliances that will save electricity in an economical manner.
- Other forms of assistance may include:
 - Energy education of occupants
 - Remediation of certain health and safety issues when prescribed by a medical doctor.
 - Remediation of defects necessary to allow the implementation of energy efficiency measures.
 - Repair and replacement of certain electric appliances.
 - Bill assistance up to a maximum of \$400 per household in a 12 month period.
 - Training support for field personnel on energy efficiency assessment and implementation techniques will also be supported by the program.

APS Energy Wise Low Income Weatherization Program

Delivery Strategy and Administration

- The program will be delivered through Community Action Agencies (CAA)⁽¹⁾ and Agencies or entities authorized by Tribal governments (Tribal Governments) serving low income households throughout the APS service areas.
- A third party manager may be selected by APS to oversee routine administration and compliance issues.
- CAA and Tribal Governments will coordinate as appropriate and deliver APS weatherization program services in conjunction with their existing activities such as Weatherization Assistance Program (WAP), the Low Income Home Energy Assistance Program (LIHEAP), and other programs as appropriate.
- To maximize the benefits of the program overall, APS, CAAs and the Tribal Governments will leverage other funding sources and services as appropriate.
- APS will provide overall program management.
- Key partnering relationships may include agencies such as the Arizona Community Action Association (ACAA), the various CAAs, Inter Tribal Council of Arizona (ITCA), Navajo Nation Weatherization services, other social service agencies and the Arizona Energy Office.

(1) Community Action Agencies (CAA) were formed by the federal government in 1964 by the Economic Opportunity Act. They provide a variety of social services. Eight CAAs serve APS service areas and are assigned geographic areas. Together they serve all of the APS service areas, with the exception of Tribal lands which by mutual agreement are served by Tribal Governments. CAAs and Tribal Governments may receive funds from multiple sources including the federally funded Low Income Housing Energy Assistance Program (LIHEAP), Department of Energy (DOE), various utility companies, and other sources.

Marketing and Communications

- Marketing for this program will be conducted primarily through the CAAs and Tribal Governments. Their offices serve a large number of customers with a variety of social services including weatherization and bill assistance.
- APS will provide informational brochures suitable for the CAAs and Tribal Governments to hand out in their offices and to leave in homes.
- APS Customer Care Associates will be trained to inform payment challenged customers of the program and direct them to the appropriate agency.
- APS will promote the program via the electric bill to targeted areas as needed.
- Signs will be provided to the CAAs and Tribal Governments. They will be suitable for placing near homes that are receiving weatherization services. They are intended to be in place during the weatherization process and removed when the work is completed.
- Window stickers will be provided. The intent is to have the weatherization provider, with the client's permission, place the sticker inside the front window when the work is complete. It will serve as a reminder that the home has been weatherized, and promote the program to the neighbors.

Program Implementation Schedule

Program Activity	Timeline											
	2005			2006			2007					
Continuation of existing program												
Modify CAA Agreements for revised program and implement Tribal Government Agreements as required												
Implementation of revised program												

Monitoring and Evaluation Plan

- The energy savings will be evaluated on the basis of a comparison of pre and post utility bills of weatherized homes which will be compiled and analyzed by the Arizona Department of Commerce Energy Office. This method provides actual measured savings on a high percentage of homes.

APS Energy Wise Low Income Weatherization Program

Program Budget

Refer to Appendix 1 for details on the distribution of funds among the Community Action Agencies and Tribal Governments. Agency and Tribal funding, incentive levels and other program elements will be reviewed and adjusted as needed during the first year from the approval date of this program, and annually thereafter, with ACC Staff review.

Budget Categories	Calendar Year			
	2005	2006	2007	3 year total
Implementation Costs				
Weatherization: Includes Weatherization, Health & Safety, Repair/Replace, Program Delivery	\$705,000	\$705,000	\$705,000	\$2,115,000
Bill Assistance	\$250,000	\$250,000	\$250,000	\$750,000
Program Support Costs				
Third party manager	\$50,000	\$50,000	\$50,000	\$150,000
Training, technical support, monitoring and evaluation	\$10,000	\$10,000	\$10,000	\$30,000
Marketing and Promotion	\$10,000	\$10,000	\$10,000	\$30,000
APS Administration	\$75,000	\$75,000	\$75,000	\$225,000
Total costs	\$1,100,000	\$1,100,000	\$1,100,000	\$3,300,000

Expenditures in excess of \$3,000,000 will be counted towards the \$48,000,000 DSM budget to which APS is committed in 2005-2007.

Weatherization expenditures are for direct costs of providing weatherization services. Examples include: assessment of the structure and appliances using current building science technologies such as blower doors, duct blasters, flow hoods, infrared heat sensors; analysis of appliances using amp meters and refrigerant pressure gages; visual inspection of the property; CAA and Tribal Agency labor; materials; contract labor.

Health and Safety funds pay for window unit air conditioners and heat pumps that are prescribed by a Medical Doctor's order.

Repair/Replace: This service is crisis related. The service provides for repair or replacement of an existing utility related appliance/system. Appliances are replaced only when repair costs would exceed replacement costs, when an appliance would be inoperable or unsafe even with repairs, or when an appliance is of such a vintage that it is economical to replace with an energy efficient model in accordance with guidelines established by the Energy Office. An assessment is not required for Repair/Replace. For example, a case worker may be visiting the home for an unrelated reason and notice that an appliance is not working. The case worker, using good judgment, can authorize a repair or replacement without doing a technical assessment of the property.

Program delivery is for expenses incurred by the CAAs and Tribal Governments that are necessary to deliver Weatherization, Health and Safety, Repair/Replace and Bill Assistance services to customers and which would not be incurred if those services were not provided. Examples include: vehicle mileage; tools; employee related expenses such as social security, Medicare, etc.; equipment rental; cost allocated shares of office and management expenses; expenses for technical training of field technicians; etc. These are the types of costs that would be included in the price that any contractor would charge.

Bill assistance is used to pay electric bills for customers in crisis situations.

Third party manager will coordinate the record keeping, invoicing and reporting through out the year. They review all invoices to assure compliance with program guidelines. They serve as a point of contact and a conduit for providing information to APS. They create and submit to APS the reports required by the ACC.

APS Energy Wise Low Income Weatherization Program

Training and technical support supplements the monitoring and evaluation conducted by the Energy Office.

Marketing and promotion is for brochures and signage for the CAAs and Tribal Governments.

APS administration is for the additional resources required to manage the expanded program with the additional constituencies. The weatherization and bill assistance program has been funded at \$500,000 since 1996. At times it has been a challenge to spend that budget. The new program requires APS to spend a minimum of \$1,000,000 each year. To facilitate that, APS has expanded coverage to include compact fluorescent lamps and refrigerators. Renters are now covered. Previously it was limited to owner occupied homes. The cap on expenditures per home has been raised from \$1,500 to \$6,000. Tribal governments are specifically included for the first time and they need training to develop technical and business skills. Tribal governments will likely not report through the third party manager that will oversee the CAAs, and that will require additional effort by APS.

All of these changes will require more management by APS if we are to reach the spending goal. It will be nearly a full time job for an Account Executive for the first year, and a significant portion of that person's time for several years.

Funds will be distributed to the CAA and Tribal Governments based largely on estimates of the number of APS low income customers in their service areas¹. Future distributions will be reviewed and adjusted annually.

Estimated Energy Savings

The most thoroughly documented cost effectiveness study of Arizona homes is from the Energy Office report titled "Present Value Analysis SWG Low-Income Weatherization Program July 1, 1999 to June 31, 2000". The data in the following tables is extracted from that report.

	Savings per Home		Equivalent Homes Served per Year ⁽¹⁾			Total Savings	
	Annual kWh	kW	2005	2006	2007	Lifetime mWh ⁽²⁾	kW ⁽³⁾
Weatherization	1,998	0.30	562	562	562	50,503	505

(1) An equivalent home is one that receives \$1,255 in APS weatherization funding. The \$1,255 is the average amount of weatherization dollars spent on the study homes. APS has historically funded only 47% of the weatherization cost for a typical home. At that rate, the number of homes weatherized using APS funds leveraged with other funds would be 1,025 in each of the 3 years. Since the cap per home is increased, APS will be contributing a larger share and the number of homes weatherized with APS funds will be between the 562 that could be served if APS funded 100%, and the 1,196 that could be served if APS funded 47%. An estimate of homes that will be weatherized with leveraged APS funds under the proposed program is the average of the two, or 879 per year.

(2) Lifetime mWh is the electric energy saved from all weatherization measures implemented in 2005-2007 over the 15 year life of the measures.

(3) kW savings is 0.30 kW/home x 562 per year x 3 years = the demand reduction from weatherizing 562 homes in each of the three years.

Weatherization Program Cost Effectiveness

Refer to "Weatherization Appendix 5" for details.

BCR Activity	Societal Benefit/Cost	Societal Net Benefit ⁽¹⁾	Societal Benefits	Societal Costs
Weatherization	0.72	(\$698,323)	\$1,807,460	\$2,505,782

(1) The Societal net benefit does not include the monetary value of the environmental externalities that are saved. The externalities are shown in the table below, along with the physical quantities of the emissions emitted and resources consumed. These have a monetary value that is not quantified.

Externalities – emissions reductions based on 50,503 mWh saved
--

APS Energy Wise Low Income Weatherization Program

SOx – 217 pounds
NOx - 8,687 pounds
CO2 – 46,311,516 pounds
PM10 – 1,197 pounds
Water – 11,767,266 gallons

APPENDIX 1

Low Income and Weatherization Program

APPENDIX 2

Incentive Calculations

APPENDIX 3

Department of Commerce Energy Office – Weatherization Assistance Program Rules

APPENDIX 4

Cost Details

APPENDIX 5

Energy Savings, Cost Effectiveness and Emissions

APS Energy Wise Low Income Weatherization Program

Appendix 1

Low Income & Weatherization Program

Agency	Budget 2004	Budget 2005
Community Action Human Resources Agency	\$31,046	\$60,000
Coconino County Community Services Dept	\$10,277	\$20,000
Gila County Community Action Agency	\$31,189	\$60,000
Maricopa County Human Services Dept	\$117,573	\$226,000
Northern Arizona Council of Government	\$86,738	\$167,000
City of Phoenix Neighborhood Services	\$108,792	\$209,000
Southeastern Az Human Resources County	\$13,883	\$27,000
Western Arizona Council of Government	\$43,886	\$85,000
Tribal Government – Navajo	\$0	\$46,000
Tribal Government - ITCA	\$0	\$54,000
Contractor - third party	\$50,000	\$50,000
Training, technical support, monitoring and evaluation	\$0	\$11,000
Marketing and promotion	\$6,616	\$10,000
APS administration	\$0	\$75,000
Total	\$500,000	\$1,100,000

A review of tax exemption codes and meter routes on tribal lands indicates a total of 5,644 APS homes on tribal lands. Census data shows that 43% of tribal homes are below 100% poverty level. Statewide, Arizona has 13.9% below 100% poverty level. Tribal poverty is 3 times the state average. The low income qualifying income is 150% of poverty. Census does not track 150% poverty. Since there are few high income homes on tribal lands we estimate that the number of homes below 150% is at least 4 times the state average. On that basis the tribe should be budgeted at 4 times the average for the state. In 2004 there were 859,069 residential customers. $\$1,000,000 / (859,069 - 5,644) = \1.17 per customer. $\$1.17 \times 4 = \4.68 per tribal customer. $\$4.68 \times 5644 = \$26,413$ annual funding for Arizona tribes.

The tribes have been unserved since 1997, 9 years. Since the program was funded at \$500,000, half of the proposed funding, the tribes would have been entitled to $\$26,413 / 2 = \$13,207$ per year, or $\$13,207 \times 9 = \$118,863$ from 1997 through 2005. To allow the tribes to recoup that deficiency in 3 years, they should be budgeted for an additional $\$118,863 / 3 = \$39,621$ per year. $\$39,621 + \$26,413 = \$66,034$ per year for 3 years.

In recognition of the difficulty of serving small numbers of APS customers dispersed over wide areas, the Tribal budget is increased to \$100,000.

APPENDIX 3

Arizona Department of Commerce Energy Office

Weatherization Assistance Program Rules

**JULY 1, 2005
EDITION**

APS Energy Wise Low Income Weatherization Program

WEATHERIZATION ASSISTANCE PROGRAM APPENDIX

I

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II

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APS Energy Wise Low Income Weatherization Program

II

ENERGY AUDIT PROCEDURE

The Weatherization Assistance Program (WAP) Energy Audit Procedure is to be used by all sub-grantees to gather, record and analyze data on structures. This data is to be used to deliver weatherization materials/measures in a fashion that protects the health and safety of the client, increase the durability of the structure, increases the comfort of the client and reduces the energy cost to the client in a cost effective manner.

The following audit activities must be completed on all homes utilizing WAP funds.

- A site audit is to be completed that records all of the relevant data on the structure that is needed to perform a cost effectiveness test.
- The Cost Effectiveness Procedure must be followed to determine cost effectiveness of potential weatherization materials/measures.
- The Pressure Diagnostic Procedure must be completed and the findings documented following the Reporting Procedures.
- A health and safety audit of the structures must be completed and the findings documented following the Reporting Procedures.

COST EFFECTIVENESS PROCEDURE

WAP has incorporated a performance based energy audit procedure that focuses on optimizing investment in energy efficiency through a systems approach. To enable the WAP program to optimize the investment in energy efficiency, the following requirements have been established for the audit procedure:

- The energy audit procedure must determine that each weatherization material/measure is cost effective by ensuring the discounted savings-to-investment ratio (SIR) is greater or equal to one.
- The energy audit procedure must assign priorities among weatherization materials/measures in descending order of SIR and must account for interactions between architectural and mechanical measures.
- The energy audit procedure must ensure that the overall SIR for the entire package of materials/measures, including the cost of incidental repairs, is greater or equal to one. Incidental repairs are only allowed if they are necessary to make the installation of weatherization materials effective.
- Funds spent to abate energy related health and safety hazards do not need to be included in the preceding requirements. Funds can be spent to eliminate health and safety hazards when the elimination of the hazard is necessary before or because of the installation of weatherization materials.

APS Energy Wise Low Income Weatherization Program

- A waiver must be received from the Energy Office before the installation measures/materials that do not meet the Cost Effectiveness or Health and Safety Requirements established by the WAP program.

To determine the cost effectiveness of weatherization materials/measures, the contractor must use a computer audit approved by the Energy Office or an appropriate priority list for homes that meet the criteria contained in the list.

APS Energy Wise Low Income Weatherization Program

FUEL SWITCHING

The Weatherization Assistance Program does not permit the general practice of fuel switching when replacing heating, cooling or water heating equipment. The changing or converting equipment using one fuel source to another will be considered on a limited case-by-case basis only.

A waiver must be received from the Energy Office prior to changing or converting equipment using one fuel source or another.

COST EFFECTIVENESS PRIORITY LIST FOR DETACHED HOUSING

CLIMATE ZONE 1 – Flagstaff, Showlow

The priority list can be used to determine cost effective weatherization materials/measures for homes located in Climate Zone 1 (see Climate Zone map). The priority list is comprised of two housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Homes with Gas Heating

- Existing ceiling insulation of R-19 or less upgraded to R-38.
- Uninsulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Water heater wrap (where allowed).

Housing Type Two: Homes with Electric Resistance Heating

- Existing ceiling insulation of R-19 or less upgraded to R-38.
- Uninsulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR DETACHED HOUSING

CLIMATE ZONE 2 – Phoenix, Casa Grande

The priority list can be used to determine cost effective weatherization materials/measures for homes located in Climate Zone 2 (see Climate Zone map). The priority list is comprised of three housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Homes with Refrigeration Cooling (AC or Heat Pump)

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Air Conditioners twenty years old or older upgraded with a minimum 12 SEER unit.
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Homes with Evaporative Cooling Only and Electric Resistance Heating

- Existing ceiling insulation of R-11 or less upgraded to R-30.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

Housing Type Three: Homes with Evaporative Cooling Only and Gas Heating

- Existing ceiling insulation of R-11 or less upgraded to R-19.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100 or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

APS Energy Wise Low Income Weatherization Program

COST EFFECTIVENESS PRIORITY LIST FOR DETACHED HOUSING

CLIMATE ZONE 3 – Prescott, Payson, Globe, Douglas

The priority list can be used to determine cost effective weatherization materials/measures for homes located in Climate Zone 3 (see Climate Zone map). The priority list is comprised of four housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Homes with Refrigeration Cooling and Electric Heating (Heat Pump or Electric Resistance)

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Shade screens on all sun struck South, East and West windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Home with Refrigeration Cooling and Gas Heating

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Three: Homes with Evaporative Cooling Only and Electric Resistance Heating

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Water heater wrap (where allowed).

Housing Type Four: Homes with Evaporative Cooling Only and Gas Heating

- Existing ceiling insulation of R-11 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy

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upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

COST EFFECTIVENESS PRIORITY LIST FOR DETACHED HOUSING

CLIMATE ZONE 4 – Tucson, Carefree, Wickenburg, Kingman

The priority list can be used to determine cost effective weatherization materials/measures for homes located in Climate Zone 4 (see Climate Zone map). The priority list is comprised of three housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Homes with Refrigeration Cooling (AC or Heat Pump)

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Air Conditioners twenty years old or older upgraded with a minimum 12 SEER unit.
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Homes with Evaporative Cooling Only and Electric Resistance Heating

- Existing ceiling insulation of R-11 or less upgraded to R-30.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

Housing Type Three: Homes with Evaporative Cooling Only and Gas Heating

- Existing ceiling insulation of R-11 or less upgraded to R-30.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR DETACHED HOUSING

CLIMATE ZONE 5 – Winslow, Tuba City

The priority list can be used to determine cost effective weatherization materials/measures for homes located in Climate Zone 5 (see Climate Zone map). The priority list is comprised of four housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Homes with Refrigeration Cooling and Electric Heating (Heat Pump or Electric Resistance

- Existing ceiling insulation of R-19 or less upgraded to R-38.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Shade screens on all sun struck east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Homes with Refrigeration Cooling and Gas Heating

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Shade screens on all sun struck east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Three: Homes with Evaporative cooling only and Electric Resistance Heating

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Water heater wrap (where allowed).

Housing Type Four: Homes with Evaporative Cooling Only and Gas Heating

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related

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repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

COST EFFECTIVENESS PRIORITY LIST FOR DETACHED HOUSING

CLIMATE ZONE 6 – Yuma, Parker, Bull Head City

The priority list can be used to determine cost effective weatherization materials/measures for homes located in Climate Zone 6 (see Climate Zone map). The priority list is comprised of three housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Homes with Refrigeration Cooling (AC or Heat Pump)

- Existing ceiling insulation of R-19 or less upgraded to R-30.
- Un-insulated frame walls upgraded with blown insulation.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Air Conditioners twenty years old or older upgraded with a minimum 12 SEER unit.
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Homes with Evaporative Cooling Only and Electric Resistance Heating

- Existing ceiling insulation of R-11 or less upgraded to R-30.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

Housing Type Three: Homes with Evaporative Cooling Only and Gas Heating

- Existing ceiling insulation of R-11 or less upgraded to R-19.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR MOBILE HOMES

CLIMATE ZONE 1 – Flagstaff, Showlow

The priority list can be used to determine cost effective weatherization materials/measures for mobile homes located in Climate Zone 1 (see Climate Zone map). The priority list is comprised of one housing type with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Priority list for Mobile Homes

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$18 per square foot).
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR MOBILE HOMES

CLIMATE ZONE 2 – Phoenix, Casa Grande

The priority list can be used to determine cost effective weatherization materials/measures for mobile homes located in Climate Zone 2 (see Climate Zone map). The priority list is comprised of three housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Mobile Homes with Refrigeration Cooling (AC or Heat Pump)

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Air Conditioners twenty years old or older upgraded with a minimum 12 SEER unit.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$8 per square foot).
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Mobile Homes with Evaporative Cooling Only and Electric Resistance Heating

- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$4 per square foot).
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

Housing Type Three: Mobile Homes with Evaporative Cooling Only

- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Replacement of jalousie windows with dual pane windows (installed cost of under \$4 per square foot).
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy

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upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR MOBILE HOMES

CLIMATE ZONE 3 – Prescott, Payson, Globe, Douglas

The priority list can be used to determine cost effective weatherization materials/measures for mobile homes located in Climate Zone 3 (see Climate Zone map). The priority list is comprised of three housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Mobile Homes with Refrigeration Cooling

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$10 per square foot).
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Mobile Homes with Evaporative Cooling Only and Electric Resistance Heating

- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$10 per square foot).
- Water heater wrap (where allowed).

Housing Type Three: Mobile Homes with Evaporative Cooling Only and Fossil Fuel Heating

- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Replacement of jalousie windows with dual pane windows (installed cost of under \$9 per square foot).
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR MOBILE HOMES

CLIMATE ZONE 4 – Tucson, Carefree, Wickenburg, Kingman

The priority list can be used to determine cost effective weatherization materials/measures for mobile homes located in Climate Zone 4 (see Climate Zone map). The priority list is comprised of three housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Mobile Homes with Refrigeration Cooling (AC or Heat Pump)

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Air Conditioners twenty years old or older upgraded with a minimum 12 SEER unit.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$7 per square foot).
- Shade screens on all sun struck south, east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Mobile Homes with Evaporative Cooling Only and Electric Resistance Heating

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$4 per square foot).
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

Housing Type Three: Mobile Homes with Evaporative cooling only and Fossil Fuel Heating

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Replacement of jalousie windows with dual pane windows (installed cost of under \$4 per square foot).
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

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In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR MOBILE HOMES

CLIMATE ZONE 5 – Winslow, Tuba City

The priority list can be use to determine cost effective weatherization materials/measures for mobile homes located in Climate Zone 5 (see Climate Zone map). The priority list is comprised of two housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Mobile Homes with Refrigeration Cooling

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$11 per square foot).
- Shade screens on all sun struck east and west windows and glass doors.
- Water heater wrap (where allowed).

Housing Type Two: Mobile Homes with Evaporative Cooling Only

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$10 per square foot).
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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COST EFFECTIVENESS PRIORITY LIST FOR MOBILE HOMES

CLIMATE ZONE 6 – Yuma, Parker, Bull Head City

The priority list can be used to determine cost effective weatherization materials/measures for mobile homes located in Climate Zone 6 (see Climate Zone map). The priority list is comprised of two housing types with a listing of cost effective upgrades.

A computer audit is required if:

- There are potential cost-effective energy upgrades to the house that are not listed on the priority list or the General Waste Heat Items list.
- There are not sufficient funds to complete all the measures; including energy related health and safety measures and other energy related repairs.
- Energy related incidental repairs of more than \$100 are included with the energy upgrades.

Housing Type One: Mobile Homes with Refrigeration Cooling (AC or Heat Pump)

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Air Conditioners twenty years old or older upgraded with a minimum 12 SEER unit.
- Shade screens on all sun struck south, east and west windows and glass doors.
- Storm windows on single pane windows (installed cost of under \$3 per square foot).
- Replacement of jalousie windows with dual pane windows (installed cost of under \$8 per square foot).
- Water heater wrap (where allowed).

Housing Type Two: Mobile Homes with Evaporative Cooling Only

- Reflective roof coating.
- Pressure diagnostics and repair following the pressure diagnostic procedure established by the WAP program.
- Replacement of jalousie windows with dual pane windows (installed cost of under \$3 per square foot).
- Upgrade of evaporative cooler motor with higher efficiency two-speed motor.
- Water heater wrap (where allowed).

In cases where there are potential cost effective energy upgrades not listed, incidental repairs of more than \$100, or sufficient funds are not available to complete **all** (energy, health and safety and energy related repairs) possible upgrades, a computerized audit must be completed to develop a ranking of the energy upgrades, based on their SIR. Only those measures with a SIR of one or greater can be completed. If sufficient funds are not available to complete all possible upgrades, those upgrades with the highest SIR must be completed first.

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GENERAL WASTE HEAT ITEMS

ALLOWABLE MEASURES WHICH DO NOT REQUIRE A COST EFFECTIVENESS TEST

Domestic Hot Water

- Adjustment of the hot water temperature to 120 degrees if approved by the client.
- Replacement of existing showerhead, which exceeds a flow rate of 2.5 GPM, with a low-flow replacement showerhead if approved by the client.
- Faucet aerators

Space Heating and Cooling Systems

- Equipment maintenance and tune-up.
- Heating or Cooling System setback thermostat(s) for people with mobility problems or other extenuating circumstances, which make it difficult for them to manually adjust thermostat set points.

Existing Evaporative Coolers

- General evaporative cooler tune-ups.
- Replacement of a single speed evaporative cooler motor with a listed two-speed motor.

MEASURES THAT CAN BE FUNDED WITH LIHEAP WAP

- Replacement Hot Water Tanks: Gas fired tanks shall have R-8.3 minimal sidewall insulation. Electric tanks shall have R-11 minimal sidewall insulation.
- Exterior doors.
- Attic ventilation.
- Replacement of wall, ceiling, and floor forced air supply registers when existing condition limits functioning of control louvers.

BASE LOAD ITEMS

ALLOWABLE MEASURES WHICH DO NOT REQUIRE A COST EFFECTIVENESS TEST

- Replacement of incandescent light bulbs, which are on for at least one hour per day, with a compact fluorescent bulbs that emits the same amount of light.
- Refrigerators replacement. All replacements must follow the Refrigerator Replacement Policy.

APS Energy Wise Low Income Weatherization Program

PRESSURE DIAGNOSTIC PROCEDURE

The pressure diagnostic procedures are to be followed when performing air leakage diagnostics and repair. These procedures provide crews with immediate feedback on the effectiveness of air sealing work, insure that repairs will provide long-term energy benefit in a safe manner, and provide essential management information needed to monitor the cost effectiveness of the air sealing programs.

Pressure Diagnostic Decision Tree

The pressure diagnostic decision tree provides assistance to agency personnel in identifying the minimum level of pressure testing that needs to be performed to meet the Weatherization Program requirements. The decision tree is comprised of two levels of housing characteristics and corresponding test requirements. In all cases, air sealing can only be performed in conjunction with pressure diagnostics.

Level One: Homes with Central Forced Air Heating or Cooling.

- The **complete** pressure diagnostic process must be followed in all cases on homes with a central forced air heating or cooling system. (Evaporative cooling is not considered a forced air system in this case.)

Level Two: Homes with No Central Forced Air Heating or Cooling

- The use of pressure diagnostic process is **optional** in homes that do not have a central forced air heating or cooling system and that do not contain the characteristics listed below.
 - **Possible cost effective envelope sealing:** Pressure diagnostics must be completed on homes where the cost of space heating and/or cooling provides possible cost effective envelope sealing opportunities.
 - **Combustion appliance zone testing:** The Worst Case Pressure Test must be performed in all zones that contain a combustion appliance.

Testing Procedure

When performing pressure diagnostic, crews are required to use the following procedures **IN SEQUENCE**. If a test is not performed, document must be provided in all cases stating the rational for not following the testing procedure.

1. Initial air leakage and room pressure tests
2. Duct repair
3. Envelope air sealing
4. Room pressure balancing

APS Energy Wise Low Income Weatherization Program

1. Initial Air Leakage and Room Pressure Tests:

These initial tests will provide reference information on the existing condition of the home. This information will be used to determine what retrofit measures are to be completed and their effectiveness.

- A. Perform a complete energy audit and combustion safety test of the house. **No pressure testing or air sealing can be done until the required combustion safety procedure is completed.**
- B. Perform Room Pressure Tests (dominant duct leakage test, room pressure test, and combustion appliance zone [CAZ] test) and record pressures. List combustion appliances located in rooms tested. **If a pressure of -3 Pascals (Pa) or more exists in a CAZ, or the possibility exists that repair work will create a pressure of -3 Pa or more in a CAZ, corrective action must be completed before or in conjunction with air sealing or duct repair.** Discuss possible corrective action with the client. **If client refuses to allow corrective action to be completed,** no air sealing or duct repair can be completed.
- C. Perform zonal pressures and record the results.
- D. Perform initial Whole House CFM50 Test and record the results.
- E. Perform Pressure Pan Test and record initial pressure difference.
- F. Based on the results of the energy audit, combustion safety tests, and pressure tests, determine the extent of work to be completed.

2. Duct Repair Procedure:

- A. Duct repair can only be performed under the supervision of a trained technician.
- B. The Health and Safety Policy must be followed at all times.
- C. Perform duct repair using approved products (see Product Guidelines) and repair techniques (see Duct Repair Techniques).
- D. After initial duct repair is performed, evaluate if additional duct repair is possible.
- E. Once all attainable duct leakage is repaired, perform post duct repair Whole House CFM50 Test and pressure pan readings. The difference between the initial Whole House CFM50 Test and the post duct repair Whole House CFM50 Test will provide the CFM reduction in duct leakage.

3. Envelope Air Sealing Procedure:

- A. All duct repairs must be completed before envelope air sealing.
- B. Envelope air sealing can only be performed under the supervision of a trained technician.
- C. The Health and Safety Policy must be followed at all times.
- D. Perform air sealing with high-quality products. Weatherization products must be permanent and guaranteed for at least 15 years.
- E. Repeat Whole House CFM50 Test after air sealing work is performed and evaluate if additional air sealing is possible (see Health and Safety Policy for CFM ventilation requirements).
- F. Once air sealing is completed, perform final Whole House CFM50 Test and record results.

4. Room Pressure Balancing:

- A. All duct repair and air sealing must be completed before room pressure balancing.
- B. Room pressure balancing can only be performed under the supervision of a trained technician.
- C. The Health and Safety Policy must be followed at all times.
- D. Perform post air sealing room pressure tests (dominant duct leakage test, room pressure test, and worst case test) and record room pressures.

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- E. Review options to remedy pressure imbalances with the client. If pressure balancing is not performed, record reasons in the work summary.
- F. Repeat room pressure tests after initial pressure balancing measures are installed and evaluate if addition pressure balancing is needed.
- G. Once pressure balancing is completed, repeat room pressure tests and record results.

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Economics

The cost effectiveness of pressure diagnostic and repair is to be based on a comparison of the present value of the reduced air leakage and the cost (labor and materials) to achieve the reduction. The values in the following tables are designed to provide general guidance on the present value of air leakage control.

Infiltration

The following table gives the present value of reducing the infiltration rate by 100 CFM50 for a typical weatherized home.

Present value of 100 CFM50 reduction	Climate Zone 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 5	Climate Zone 6
	\$160	\$40	\$90	\$40	\$90	\$40

Duct Leakage

The following table gives the present value of reducing duct leakage by 100 CFM50 for a typical weatherized home.

Present Value of 100 CFM reduction	Climate Zone 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 5	Climate Zone 6
Heating	\$800	\$90	\$345	\$95	\$385	\$50
Cooling*	\$10	\$450	\$80	\$300	\$100	\$870

*If a home has only evaporative cooling, only the heating values will be realized in duct repair.

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HVAC EQUIPMENT AND DISTRIBUTION INSTALLATION/REPAIR POLICY

The following policy must be strictly adhered to when installing or repairing HVAC equipment and distribution systems.

Sizing & Installing HVAC Equipment

- Minimum HVAC efficiencies:
 - AC: 12 SEER
 - Heat Pump: 12 SEER and 7 HSPF
 - Combustion furnace: 80% AFUE.
- New mechanical systems shall be sized according to the ACCA Manual J. Room-by-room load calculations using the ACCA Manual J shall be submitted for each plan to verify sizing.
- Airflow across the indoor coil and/or heat exchanger shall conform to the manufacturer's specifications.
- Refrigerant charge shall be installed per the manufacturer's specifications.
- Indoor and outdoor units shall be "matched" according to the ARI Directory.

Installation of Forced Air Distribution Systems

- All new ductwork must be installed according to the Duct Installation/Repair Techniques and Product Guidelines.
- All duct systems must be pressure tested and the CFM leakage rate cannot exceed 3% of the systems air handler capacity.
- Airflow to each room shall match designed airflow calculations from the ACCA Manual J to within +/- 10%.

Repair of Existing Systems

All ductwork must be repaired according to the Duct Installation/Repair Techniques and Product Guidelines.

Evaporative Cooler Installation

It is strictly prohibited to install a new evaporative cooler on the ductwork of a forced air heating or cooling system.

All existing evaporative coolers must be equipped with a damper system that allows the cooler to be isolated from forced air ductwork or the conditioned space.

Duct Installation/Repair Techniques

- A. Flex ducts
 - Seal the start collar to the plenum using mastic reinforced with mesh around the entire circumference.
 - At all connections (triangles, junction boxes, etc.), fasten the inner liner to the start collar using a mechanically tightened draw band for mechanical strength.
 - Seal the inner liner using approved mastic reinforced with fiberglass mesh and overlaid with another layer of mastic sufficient to cover the entire pattern in the mesh.

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- Fasten the outer liner well over the start collar using a mechanically tightened draw band.
- Seal all boots to the Sheetrock using mastic or silicone caulk applied at the point where the air barrier (metal or exterior foil backing) meets the Sheetrock.

B. Duct board

- Staple all duct board joints with appropriate staples every two inches.
- Apply a layer of mastic; embed reinforcing mesh and overcoat with another layer of mastic sufficiently thick to hide the pattern in the tape.
- Allow for proper curing (manufacturer's specifications) before starting the system. This is critical.
- Seal all boots to the Sheetrock at the point where the foil backing meets the Sheetrock.

C. Metal

- Seal all points where components join together using mastic. Special attention must be given to any area where tabs provide the method of securing the joint.
- Seal all boots to the Sheetrock at the point where the metal meets the Sheetrock.
- Join all components with screws or other mechanical fastening devices as required in listings or code.

D. Building Cavities Used as Returns

- If the cavity is lined with Sheetrock, seal all joints with mastic. All gaps over 1/4 inch must be reinforced with embedded mesh tape.
- If the cavity is lined with duct board with the fiberglass side facing inside, you must create a positive air barrier in the plenum by covering the fiberglass with a material such as Sheetrock, duct board with the foil facing inside, or coat the fiberglass with mastic, etc., and seal all remaining joints in the plenum.
- If the cavity is unlined (exposed studs) and it is impossible to line the plenum, seal all joints, holes and penetrations using mastic applied with a brush attached to a handle or other extension. It may be easier and more effective to simply create a ducted plenum or chase and avoid the problems associated with using a building cavity to convey conditioned air.
- It may be necessary to cut a hole in the plenum in order to gain access and seal the interior adequately.

E. Air Handler

- Seal all penetrations and gaps between materials using mastic or silicone. If the gap is over 1/4 inch, reinforce with fiberglass mesh.
- Seal the areas where the air handler meets the supply/return plenums using mastic reinforced with fiberglass mesh or other approved methods.
- Seal any panels that will require frequent access by the client (such as the filter area), using a quality temporary tape (duct tape).
- The air handler must not have any noticeable leaks.

F. Wall Penetrations

(The most common wall penetration problem is where the opening for the return grille is cut through the wall. In such an installation, even in a lined plenum, the wall cavity is open into the plenum.)

- Where an un-ducted section of the air distribution system penetrates a wall cavity, the wall cavity must be sealed.
- The cavity will first be blocked using a rigid air barrier such as Sheetrock or duct board with the foil facing the airflow.
- All seams, cracks, crevices, and openings will then be sealed airtight using approved mastic.

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PRODUCT GUIDELINES

- All new ductwork will be a minimum of R-6.
- Duct sealing materials shall have both excellent cohesive and adhesive qualities.
- Water-based Latex mastic with at least 50 percent solids reinforced with fiberglass mesh at all duct connections, joints and seams shall be used. "Hardcast" type mastic with reinforcing mesh is also acceptable.
- The ducts shall be further attached as per manufacturer's specification, using a draw tie, plumbing strap or screws, as appropriate for a strong mechanical connection. The mechanical connection **does not** replace air sealing.
- Foil tapes, including UL 181 AP-type tapes, when used alone will not be accepted. If tape is used to temporarily hold a seam, it must be overlaid with a coating of mastic that extends at least one inch (1") past the tape on all sides, and is thick enough to hide the tape completely.
- Do not use materials that are potentially damaging or have harmful effects, such as toxic vapors or carcinogenic substances that may be harmful to the clients or the installer. Agencies are required to obtain and maintain the Material Safety Data Sheets (MSDS) for all materials used on the job. Federal law requires this procedure; further information is available locally from the vendor.
- Materials must meet all current codes and manufacturer's specifications.

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HEALTH AND SAFETY PLAN

PURPOSE

To establish the policies and procedures under which health and safety concerns are addressed in the Weatherization Assistance Program (WAP).

GOAL

To ensure energy savings are the result of Weatherization Assistance Program actions while promoting a healthy and safe environment for clients and WAP workers and contractors.

SCOPE

Energy-related health and safety concerns need to be remedied before, or because of, the installation of weatherization materials. Therefore, energy-related health and safety hazards associated with weatherization activities may be remedied or prevented with DOE funds. Measures and their costs must be reasonable and must not seriously impair the primary energy conservation purpose of the program.

The Health and Safety Procedures are applicable to all activities under the WAP.

A. Grantee Health & Safety

The Arizona Energy Office – WAP field monitors will follow all applicable health and safety rules with respect to the conduct of their on-site job visits including the use of face masks, hard hats, appropriate footwear, and such other applicable attire and equipment so as to minimize personal risks.

B. Crew and/or Contractor Health & Safety

Arizona Subgrantees and their contractors will comply with Occupational Safety and Health Administration (OSHA) requirements in all weatherization activities.

The costs for Subgrantees to comply with OSHA requirements (action items & measures that DOE funds and receives credit for) may be charged under health and safety, tools and equipment, incidental repairs, etc. The cost category selected will be charged consistently throughout the state (from agency to agency) for the same activity.

Because of the wide range of activities involved in weatherizing a house, ensuring crew health and safety requires a broad knowledge of the appropriate OSHA requirements. Some of these requirements include, but are not limited to: respirator protection, techniques for safely lifting heavy objects, electrical equipment safety, ladder safety, and general worker protection. OSHA standards should be consulted for further details.

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Other useful information includes Material Safety Data Sheets (MSDS) that identify potential health risks and describe the proper use, handling, and storage of a wide variety of materials, including some common weatherization materials. MSDS also recommend personal protective equipment and address first aid measures.

C. Client Health and Safety

Weatherization services can be provided in a manner that minimizes risk to workers and clients. Although the Weatherization Assistance Program does not provide all the solutions, awareness of potential hazards is essential to providing quality services. A list of the more common hazards and DOE's preferred approach to them are discussed in Section D. Other energy-related hazards should be considered on a case-by-case basis.

Grantees and subgrantees are required to take all reasonable precautions against performing work on homes that will subject workers or clients to health and safety risks. If there is any doubt that weatherization work can be conducted in a manner that is safe for all parties concerned, the Subgrantee must not proceed further.

Before beginning work on the residence, Subgrantees will take into consideration the health concerns of each occupant, the condition of the dwelling, and the possible effect of work to be performed on any particular health or medical condition of the occupants. When a person's health is fragile and/or the work activities would constitute a health or safety hazard, the occupants at risk will be required to leave the home during these work activities or the work will be suspended until such a time as it can be performed appropriately.

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D. Potential Hazard Considerations

1. Biologicals

Removal of mold, odors, viruses, bacteria, unsanitary (including raw sewage) conditions, and rotting wood is not a Weatherization responsibility; however, Subgrantees frequently encounter these conditions. DOE funds may be used if these conditions must be remedied to allow effective weatherization work and/or to assure the immediate or future health of workers and clients. The Arizona Energy Office – WAP requires that its Subgrantees seek prior approval to proceed before attempting to weatherize such dwellings with *Biological* problems.

Arizona Subgrantees will exercise caution when selecting air tightness limits for dwellings with these problems. Since these conditions are often related to moisture, Arizona subgrantees may use DOE health & safety funding to acquire moisture detection instruments. Subgrantees should incorporate moisture detection into their initial energy audits. If necessary, weatherization services may need to be delayed until moisture problems can be corrected by other funding sources.

2. Combustion Appliances and Combustion Gases

The following policy must be strictly adhered to when completing Weatherization work. If any house fails these program safety standards and the problem cannot be remedied, the homeowner must be notified in writing and a copy placed in the client's file.

- Perform air sealing and duct repair **only** in conjunction with pressure diagnostics to ensure that sufficient ventilation and draft rates are maintained in the home.
- A UL listed carbon monoxide detector (Underwriters Laboratories 2034-98) shall be installed in all structures with an attached garage or a combustion appliance located in the conditioned space.
- Research and follow the local health and safety codes and standards dealing with residential ventilation requirements for occupants and combustion equipment.
- No air sealing (including duct repair) should be done if there is a high pollution source, such as a non-vent combustion heater, that can't be removed.
- No air sealing (including duct repair) should be done if there are existing health and safety problems in the home.
- No air sealing (including duct repair) should be done if there is Carbon Monoxide (CO) present in the flue gases higher than 100 PPM.
- No air sealing (including duct repair) should be done if there is a possible gas leak.
- No air sealing (including duct repair) should be done if CO is greater than 9 PPM in the living space.
- If CFM50 is less than 1500 CFM for the home or 300 CFM per person (whichever is greater), the homeowner must be advised of the tightness of the home. Any further air sealing (including duct repair) may require that an active ventilation strategy be employed.

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- Under normal operating conditions, an air handler cannot create room pressures with a magnitude greater than - 3.0 Pascals, with reference to outside, anywhere in a combustion appliance zone.
- Corrective action must be completed before or in conjunction with air sealing (including duct repair) if a negative pressure of greater than 3 pascals exists or is produced by repair work in a combustion appliance zone.
- Flame change is an indication of a cracked heat exchanger - no air sealing (including duct repair) should be done until the problem is fixed.
- If spillage of flue gases occurs for more than one minute - no air sealing (including duct repair) should be done until the problem is fixed.
- If draft is low, it must be fixed before air sealing (including duct repair) is completed.

Minimum draft pressures required as follows:

- Outside temperature below 20° F, -5.0 pascals draft
- Outside temperature 20° to 40° F, -4.0 pascals draft
- Outside temperature 40° F to 60° F, -3.0 pascals draft
- Outside temperature 60° F to 80° F, -2.0 pascals draft
- Outside temperature above 80° F, -1.0 pascals draft

IF THE CONDITIONS DESCRIBED BELOW CONCERNING COMBUSTION AIR ARE NOT MET, NO AIR SEALING (INCLUDING DUCT REPAIR) SHOULD BE DONE:

- In homes of ordinary tightness insofar as infiltration is concerned, all or a portion of the air for fuel-burning appliances may be obtained from infiltration when the requirements for 50 cubic feet per 1000 Btu/hr input is met. Two openings are required and one shall be within 12 inches of the bottom of the space containing the combustion equipment. Openings shall allow space to communicate with the rest of the house. A minimum free area of one square inch per 1000 Btu per hour (or 100 square inches, which ever is greater) of the total input rating of all gas utilization equipment in the space, shall be provided.
- In all cases where combustion air is from inside the home, the homeowner must be made aware of this and sign the Health and Safety Waiver before any airtighting or duct repair is completed. (Note: If this method is used, special attention must be given to zonal and draft pressures. In buildings of unusually tight construction, combustion air shall be obtained from outside.)
- In homes that receive combustion air from outside the conditioned space, two openings are required. One shall be within 12 inches of the top and one within 12 inches of the bottom of the space containing the combustion equipment. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that communicate with the outdoors.
- The following guidelines must be met when determining the minimum free area for combustion air openings:

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- Openings directly communicating with the outdoors shall provide one square inch per 4000 Btu per hour of the total input of all gas utilization equipment in the space.
- Openings communicating to outdoors with vertical ducts shall provide one square inch per 4000 Btu per hour of the total input of all gas utilization equipment in the space.
- Opening communicating to outdoors with horizontal ducts shall provide one square inch per 2000 Btu per hour of the total input of all gas utilization equipment in the space.

(NOTE: If the free area is not known because of louvers or screens, double the required opening size. **IF THESE NFPA 54 NATIONAL FUEL GAS CODE REQUIREMENTS ON COMBUSTION AIR ARE NOT MET, THEN NO AIR SEALING (INCLUDING DUCT REPAIR) SHOULD BE DONE UNTIL THESE CONDITIONS ARE MET.**)

3. Fire Hazards

Combustion appliances and their associated venting systems can also present potential fire hazards. Subgrantees that accept clients with wood stoves and fireplaces will have procedures to identify potentially dangerous creosote build-up in chimneys and wood stove flues.

It is the Subgrantee's responsibility to ensure that any work on wood stoves and fireplaces conforms with applicable codes in jurisdictions where the work is being performed.

4. Existing Occupant Health Problems

Subgrantees will be sensitive to client health problems that might be exacerbated by weatherization activities.

Subgrantees will establish procedures to identify pre-existing client conditions (e.g., allergies) and address such problems when they are found. Those procedures should address the manner in which such problems will be identified and the steps to be taken to ensure that weatherization work will not worsen these problems.

5. Indoor Air Quality (IAQ)

a. Asbestos

General asbestos removal is not approved as a DOE WAP health and safety weatherization cost.

Major asbestos problems should be referred to the Arizona Department of Environmental Quality or to the Environmental Protection Agency (EPA).

Where local agencies work on large heating and distribution systems, including related piping, asbestos removal may be necessary. Removal is allowed to the extent that energy savings resulting from the measure will provide a cost-effective savings-to-investment ratio. This would normally be true with work done on large, multifamily heating systems. Where permitted by code or EPA regulations, less costly measures that fall short of asbestos removal, such as encapsulation, may be used. Removal and replacement of asbestos siding for purposes of wall cavity insulation is permissible if allowed by state and local codes.

b. Radon

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Where there is a previously identified radon problem, work that would exacerbate this problem should be limited. Radon abatement is not an allowable activity under the Weatherization program. However, those costs associated with taking precautions in a dwelling known to have radon problems are allowable weatherization expenditures. These costs are allowable if an energy audit indicates that weatherization techniques would help in radon remediation. While Subgrantees should establish sound radon-related strategies, major radon problems should be referred to the appropriate local environmental organization or agency for mitigation or abatement.

c. Formaldehyde and Volatile Organic Compounds (VOCs)

Formaldehyde vapors may be slowly released by some new carpets, wafer-board, plywood, etc. Some household cleaning agents also emits VOCs. Caution should be taken when selecting air tightness limits in dwellings with VOC problems.

6. Lead Paint

In May 2001, the Weatherization Assistance Program (WAP) issued Program Notice 01-10, Weatherization Activities and Federal Lead-Based Paint Regulations. This document and its attachments lay out the requirements for Arizona's sub-grantees and their contractors to follow when working in homes with lead-based paint.

Lead-based paint dust and other residues are hazards that Weatherization workers are likely to encounter in older homes. HUD estimates that four million homes have significant lead-based paint hazards. Furthermore, some Weatherization work (working with older wood sash windows) may directly disturb lead-based paint, possibly creating hazardous conditions. Arizona's WAP policy is that Weatherization workers must be aware of the hazard and conduct Weatherization activities in a safe work manner to avoid contaminating homes with lead-based paint dust and debris, and to avoid exposing the occupants, themselves and their families to this hazard. The protocols used to safe guard people from lead-based paint hazards are called Lead Safe Weatherization (LSW).

Arizona's Lead Safe Weatherization Protocols

LSW is a set of protocols to be used when disturbing surfaces that may have lead-based paint, that will reduce and control the amount of lead dust and paint chips that are generated. Arizona has adopted the protocols developed by the Montana State University. These protocols are attached or the curriculum is available for review on the WAPTAC website www.waptac.org.

When is LSW necessary.

Local sub-grantees will use the following set of criteria for determining when LSW would be performed:

- The dwelling was constructed pre-1978, and
- The dwelling has not been determined to be lead-based paint free, and
- Either, the amount of disturbed lead-based painted surface exceeds two square feet per room of interior surface, twenty square feet of exterior surface, or 10 percent of a small component type, e.g., window; or the amount of lead-based paint dust that will be generated by the Weatherization work exceeds the OSHA-defined airborne levels for lead.

Testing for lead-based paint and lead-based paint residues.

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Testing for lead-based paint is not an allowable weatherization expense except, when it is related to the installation of energy efficiency measures. These expenditures must be within the limits set by the state in its Weatherization health and safety plan.

In pre-1978 houses where the presence or absence of lead-based paint has not been determined, testing for lead-based paint could be worthwhile as an economy step. If the anticipated weatherization/energy efficiency work involves disturbing more than a small amount of painted surfaces, then ruling out the presence of lead in the paint would save extra time and costs associated with doing LSW practices. Testing in a home for lead in a painted surface, when it is done, is limited to only those surfaces that will be disturbed.

The following considerations are offered as a guide to determining whether testing is worth the time and money on a case-by-case basis:

- Houses (including mobile homes, and apartments) built from 1978 on may be assumed to be free of lead-based paint, without testing.
- In houses (including mobile homes, and apartments) built prior to 1930, it is logical to simply assume the presence of lead-based paint and save the cost of testing.
- In homes built between 1930 and 1978, testing may not be warranted if the amount of paint to be disturbed is small, since it may be cheaper to perform LSW for a small area than to incur the expense of testing. However, where the amount of paint to be disturbed is relatively large, it may be worth the cost of testing, since a negative result would mean that the crews could dispense with having to perform the LSW protocols.

Routine testing of every house for lead paint levels before the start of work (testing of painted surfaces to be disturbed and/or risk assessment) and at the end (clearance testing) is a standard practice associated with lead paint hazard control or abatement work and is not an allowable use of DOE Weatherization funds, except as required when weatherization work is being done on HUD homes or with HUD funds. If a sub-grantee establishes a regimen of routine risk assessment and clearance testing for all cases where the presence of lead paint is a possibility, the sub-grantee must use other sources of funding to implement such a policy.

NOTE: HUD's guidance to its properties has been to test all properties for the presence of lead-based paint; so, the HUD program housing in your area may already have been tested for lead-based paint.

About Clearance Testing - Clearance testing (as required by the HUD Rule) is not a requirement for Weatherization work per se. **As such, clearance testing is not an allowable expenditure of DOE funds.**

However, under some circumstances, clearance testing may be required if you are doing Weatherization work in HUD program housing or you are using HUD funds. In these instances, your first course of action should be to ask the HUD program to fund the additional cost for LSW and clearance testing. If no HUD funds are available, DOE funds may be used for clearance testing since it is a requirement in this instance.

Arizona subgrantees must seek prior approval in every instance before DOE WAP funds will be approved for clearance testing in allowable *special situations* involving HUD housing.

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Deferrals

Arizona's WAP sub-grantees will follow the lead-based paint "deferral policy" to determine when it is prudent to defer certain Weatherization work in homes that have either tested positive or are assumed to have lead-based painted surfaces.

- First, the subgrantee should assess the following factors:
 - 1) Is the subgrantee prepared to work with lead-based paint? (i.e., have workers received training in LSW work practices - is the necessary equipment, such as HEPA vacuum cleaners, available; and does the agency's liability insurance cover work with lead-based paint);
 - 2) What is the condition of the painted surfaces in the house that might be specifically disturbed in the course of an allowable weatherization measure? (i.e., are they *seriously* deteriorated);
 - 3) What is the extent to which the specific energy efficiency measures determined by the audit will disturb painted surfaces? (i.e., will the disturbance likely generate dust in excess of OSHA minimums); and,
 - 4) Will the cost of doing LSW work represent a large portion of the total cost, such as to exceed the amount allowed by the state's health and safety plan (which could be the case if large amounts of lead-based paint surfaces will be disturbed)?
- Second, the grantee should determine, based on consideration of the above factors, whether to:
 - 1) proceed with all the weatherization work, following LSW work practices; or
 - 2) Do some of the weatherization tasks, defer others; or
 - 3) Defer all the weatherization work

Deferral would mean postponing the work either until the Weatherization agency is prepared to work with lead-based paint, or until another funding source has been identified that can finance corrections to the problem LPB area that weatherization can be safely performed.

In cases where extensive LSW would be necessary, agencies are encouraged to arrange with other organizations, which are funded to do lead-based paint hazard control, to perform some of the more costly activities, such as risk assessment or clearance testing.

In areas where there are no organizations performing such work, Weatherization agencies may choose to develop their capabilities (purchase of equipment and advanced training for subgrantee crews) for lead-based paint hazard control work, but they may not use DOE Weatherization funds for this purpose. In such a home, regular Weatherization work that does not disturb painted surfaces can be done.

Funding of lead safe weatherization

Whereas DOE funds may be used to pay for Weatherization activities that disturb lead-based painted surfaces while installing energy efficiency measures or for case-by-case testing, the funds may not otherwise be used for abatement, stabilization or control of lead-based paint hazards, or routine entrance and clearance testing.

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However, U. S. Department of Housing and Urban Development (HUD) funds such as Community Development Block Grant (CDBG), lead hazard control programs and HOME Repair and Rehabilitation Program funds may be used to do this work. Also, U. S. Department of Health and Human Services' (HHS) Low-Income Home Energy Assistance Program (LIHEAP), may be used for certain expenses related to Lead Safe Weatherization.

Specifically, for DOE funding, agencies should budget LSW costs under health and safety as a separate cost category, excluded from the calculation of average cost per home. Lead Safe Weatherization costs include labor, material, insurance, training, and equipment.

Liability issues

Unless an agency has specifically purchased additional insurance to cover pollution occurrences, they probably do not have sufficient insurance for their work as required by the WAP's Program Year 2002 Annual Guidance, **Weatherization Program Notice 02-1**. It is likely that their general liability insurance has a pollution occurrence exclusion.

All Arizona Sub-grantees must have liability insurance that covers work in a home with lead-based paint before any LSW work is implemented. **This liability insurance does not and should not cover lead abatement projects.**

Abatement projects are extensive projects designed to permanently eliminate the lead-based paint hazard. Only work that HUD refers to as "interim controls" must be covered. It is important to use this policy to demonstrate to the insurer the limited nature of the paint disturbance and the precautions being taken to avoid liability. The cost of such insurance is an allowable DOE expense, and we urge agencies to seek ways to obtain the coverage at reasonable rates.

For insurance shopping purposes, there are features about Weatherization work that local agencies should use in making the case for the lower risk associated with the nature of Weatherization work, especially when compared to lead-based paint abatement and lead hazard control work:

- Weatherization is different from lead hazard control work and involves lesser levels of work associated with painted surfaces. In fact, the disturbance of painted surfaces, by comparison, is minimal and when it happens, is incidental to the purpose of the work - the installation of energy conserving measures.
- In addition, not all weatherization work involves disturbing painted surfaces and some homes are lead free, and so the *risk basis* for insurance rates - unlike insurance for lead hazard control work - should not be based on one hundred percent operations in a lead paint environment for every home weatherized.

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DOE is involved with EPA and HUD in continuing discussions with the insurance industry about ways to qualify Weatherization agencies for more favorable rates. We also welcome suggestions from state and local agencies with experience in obtaining reasonable rates for this kind of work, which we will share with the Arizona subgrantees.

Training

Arizona's WAP requires that *when disturbance of painted surfaces is significant*, Weatherization workers will use LSW practices.

Arizona's WAP will provide or recognize prior participation in the following training opportunities to sub-grantee as required, taking into consideration each subgrantees mix of action items and allowable measures:

- LSW workshops provided by trainers who are certified in The HUD Lead Safe Work Practices.
- Peer-to-Peer training.
- Individual agency training on an as needed basis.

All training will utilize the Lead Safe Weatherization curriculum developed by Montana State University.

7. Building Structure

Building rehabilitation is beyond the scope of the Weatherization Assistance Program; however, Arizona Subgrantees frequently encounter homes in poor structural condition. Dwellings whose structural integrity is in question should be referred to the Arizona Department of Housing.

Weatherization services may need to be delayed until the dwelling can be made safe for crews and occupants (see Deferral Standards).

Incidental repairs necessary for the effective performance or preservation of weatherization materials are allowed if the cost of the weatherization material and incidental repair are cost justified by the audit. Examples of these limited repairs include sealing minor roof leaks to preserve new attic insulation and repairing water-damaged flooring as part of replacing a water heater.

8. Electrical Issues

The two primary energy-related health and safety electrical concerns are 1) insulating homes that contain knob-and-tube wiring and 2) identifying overloaded electrical circuits.

Older electric wiring, primarily knob-and-tube wiring, located in a wall cavity or exposed on an attic floor was originally intended by code to have *free air movement* for that would cool the wire when carrying an electric current. Laboratory tests have shown that retrofitting thermal insulation around electric wiring can cause it to overheat, resulting in a fire hazard.

Arizona program policy requires that Subgrantees ensure that insulation around knob-and-tube wiring conforms with applicable codes in jurisdictions where the work is being performed.

Serious electrical hazards exist when gross overloads are present. Should auditors and crews find such existing problems, they must notify the owner verbally and in writing by the Subgrantee WAP program manager.

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Weatherization measures that involve the installation of new equipment such as air conditioners, heat pumps, or electric water heaters can exacerbate previously marginal overload problems to hazardous levels. The problem must also be noted in the client file. To the extent that these problems prevent adequate weatherization, the agency should consider repairing them on a case-by-case basis.

9. Refrigerant Issues

The replacement of air conditioners requires Subgrantees to ensure that the requirements of the Clean Air Act 1990, section 608, as amended by 40 CFR 82, 5/14/93, be enforced. The appliance vendor, de-manufacturing center, or other entity recovering the refrigerant must possess EPA-approved section 608 type I or universal certification. Subgrantees must ensure they have appropriate protocols in place that comply with all standards relating to the disposal of the existing appliances.

10. Other Code Compliance Issues

It is the Subgrantee's responsibility to ensure that weatherization-related work conforms with applicable codes in jurisdictions where the work is being performed.

E. Deferral Standards

The decision to defer work in a dwelling is difficult, but necessary, in some cases. This does not mean that assistance will never be available, but that work must be postponed until the problems can be resolved and/or alternative sources of help are found. Note that subgrantees, including crews and contractors, are expected to pursue reasonable options on behalf of the client, including referrals, and to use good judgment in dealing with difficult situations.

Subgrantees will develop guidelines and a standardized form for such situations. The form will include the client's name and address, dates of the audit/assessment and when the client was informed, a clear description of the problem, conditions under which weatherization could continue, the responsibility of all parties involved, and the client(s) signature(s) indicating that they understand and have been informed of their rights and options.

Deferral conditions may include:

- The client has known health conditions that prohibit the installation of insulation and other weatherization materials.
- The building structure or its mechanical systems, including electrical and plumbing, are in such a state of disrepair that failure is imminent and the conditions cannot be resolved cost-effectively.
- The house has sewage or other sanitary problems that would further endanger the client and weatherization installers if weatherization work were performed.
- The house has been condemned or electrical, heating, plumbing, or other equipment has been "red tagged" by local or state building officials or utilities.
- Moisture problems are so severe they cannot be resolved under existing health and safety measures and with minor repairs.
- Dangerous conditions exist due to high carbon monoxide levels in combustion appliances, and cannot be resolved under existing health and safety measures.
- The client is uncooperative, abusive, or threatening to the crew, subcontractors, auditors, inspectors, or others who must work on or visit the house.

APS Energy Wise Low Income Weatherization Program

- The extent and condition of lead-based paint in the house would potentially create further health and safety hazards.
- In the judgment of the energy auditor, any condition exists which may endanger the health and/or safety of the work crew or subcontractor, the work should not proceed until the condition is corrected.

APS Energy Wise Low Income Weatherization Program

REFRIGERATOR REPLACEMENT POLICY

The following criterion apply to replacement refrigerators:

ELIGIBILITY FOR REPLACEMENT

Weatherization Program Notice 00-5 lists the types of refrigerators that may be installed with U.S. Department of Energy (DOE) funds. Refrigerators and refrigerator-freezers with manual, automatic, or partial automatic defrost are eligible. Units must comply with UL-250 and with energy efficiency standards established in the National Appliance Energy Conservation Act of 1987 that are periodically updated. New replacement units may **not** have through-the-door ice or water service since this feature increases energy use.

To qualify for replacement, the refrigerator replacement unit must result in a savings-to-investment ratio (SIR) of 1.0 or greater.

To determine the SIR, one of the following methods must be used to determine the energy use of the existing unit:

- Refrigerator replacement analysis tools that utilize the Association of Home Appliance Manufacturers or other approved refrigerator databases.

- Meter electric usage of the existing unit utilizing an approved meter. A list of approved meters is available from the Arizona Energy Office.

METERING REQUIREMENTS

Meter at least 10% of units replaced — It is not required to meter every existing refrigerator that is replaced. Initially, as the program gains experience, DOE will require metering on at least 10% of the units replaced. Units that cannot be located in the Association of Home Appliance Manufacturers, or other refrigerator databases, may make up all or most of the 10% requirement.

Meter at least 2 hours — The minimum metering duration required to obtain results accurate enough to make a reliable replacement decision has been debated for several years. DOE believes a two-hour minimum metering duration is an appropriate compromise.

MATERIALS

New refrigerators shall:

- Not exceed the size as the replaced unit.

- Not exceed 18 cubic feet in size.

- Have a minimum 1-year warranty.

INSTALLATION

The electrical outlet shall:

- Provide the voltage specified on the ID plate of the new refrigerator.

- Be properly grounded and/or protected with a properly functioning GFCI device.

- Be located within reach of the refrigerator without the use of an extension cord.

APS Energy Wise Low Income Weatherization Program

Be in good condition with nothing visibly wrong (e.g., not cracked or broken, and no spark, smoke, or burn marks, etc.).

Meet refrigerator manufacturer's specifications for space and clearances.

The contractor shall:

- Deliver and install the new refrigerator.
- Level the unit to ensure proper operation.
- Ensure that door hinges are on the appropriate side.
- Instruct the customer on refrigerator operation.
- Deliver warranties and operating manuals to the customer.
- Set temperature controls appropriately.

DISPOSAL

The contractor shall:

- Take unit out of service. Make sure the existing refrigerator, removed from the house, does not find its way back onto the electric grid.
- Dispose of unit in an environmentally responsible manner. All refrigerators replaced must be properly disposed of according to the environmental standards in the Clean Air Act of 1990, section 608, as amended by Final Rule 40 CFR 82, May 14, 1993.
- Take unit to a de-manufacturing facility or incorporate disposal requirements in vendor contract.
- Remove all packing materials from the customer's premises.

REPORTING

The sub-grantee shall record the following information for both the existing and replacement refrigerators on the Household Reporting Form:

- Manufacturer (for years available).
- Brand.
- Year of manufacture.
- Model number.
- Type (e.g., side-by-side, top freezer).
- Database estimated kWh/yr.

On metered units, the sub-grantee shall provide an estimated annual kWh usage and the duration of metered data.

Provide saving to Investment Ratio for the replacement refrigerator.

WAIVERS

There may be cases where it is the best interest of the client that a refrigerator be installed that does not meet the requirements of the Weatherization Assistance Program Refrigerator Replacement Policy. In these cases, the Weatherization Assistance Program Waiver Process must be followed.

APS Energy Wise Low Income Weatherization Program

ARIZONA WEATHERIZATION ASSISTANCE REFRIGERATOR REPLACEMENT POLICY

The following criterion apply to replacement refrigerators:

ELIGIBILITY FOR REPLACEMENT

Weatherization Program Notice 00-5 lists the types of refrigerators that may be installed with U.S. Department of Energy (DOE) funds. Refrigerators and refrigerator-freezers with manual, automatic, or partial automatic defrost are eligible. Units must comply with UL-250 and with energy efficiency standards established in the National Appliance Energy Conservation Act of 1987 that are periodically updated. New replacement units may **not** have through-the-door ice or water service since this feature increases energy use.

To qualify for replacement, the refrigerator replacement unit must result in a savings-to-investment ratio (SIR) of 1.0 or greater.

To determine the SIR, one of the following methods must be used to determine the energy use of the existing unit:

Refrigerator replacement analysis tools that utilize the Association of Home Appliance Manufacturers or other approved refrigerator databases.

Meter electric usage of the existing unit utilizing an approved meter. A list of approved meters is available from the Arizona Energy Office.

METERING REQUIREMENTS

Meter at least 10% of units replaced — It is not required to meter every existing refrigerator that is replaced. Initially, as the program gains experience, DOE will require metering on at least 10% of the units replaced. Units that cannot be located in the Association of Home Appliance Manufacturers, or other refrigerator databases, may make up all or most of the 10% requirement.

Meter at least 2 hours — The minimum metering duration required to obtain results accurate enough to make a reliable replacement decision has been debated for several years. DOE believes a two-hour minimum metering duration is an appropriate compromise.

MATERIALS

- New refrigerators shall:
- Not exceed the size as the replaced unit.
- Not exceed 18 cubic feet in size.
- Have a minimum 1-year warranty.

INSTALLATION

- The electrical outlet shall:
- Provide the voltage specified on the ID plate of the new refrigerator.
- Be properly grounded and/or protected with a properly functioning GFCI device.
- Be located within reach of the refrigerator without the use of an extension cord.

APS Energy Wise Low Income Weatherization Program

Be in good condition with nothing visibly wrong (e.g., not cracked or broken, and no spark, smoke, or burn marks, etc.).

Meet refrigerator manufacturer's specifications for space and clearances.

The contractor shall:

Deliver and install the new refrigerator.

Level the unit to ensure proper operation.

Ensure that door hinges are on the appropriate side.

Instruct the customer on refrigerator operation.

Deliver warranties and operating manuals to the customer.

Set temperature controls appropriately.

DISPOSAL

The contractor shall:

Take unit out of service. Make sure the existing refrigerator, removed from the house, does not find its way back onto the electric grid.

Dispose of unit in an environmentally responsible manner. All refrigerators replaced must be properly disposed of according to the environmental standards in the Clean Air Act of 1990, section 608, as amended by Final Rule 40 CFR 82, May 14, 1993.

Take unit to a de-manufacturing facility or incorporate disposal requirements in vendor contract. Remove all packing materials from the customer's premises.

REPORTING

The sub-grantee shall record the following information for both the existing and replacement refrigerators on the Household Reporting Form:

Manufacturer (for years available).

Brand.

Year of manufacture.

Model number.

Type (e.g., side-by-side, top freezer).

Database estimated kWh/yr.

On metered units, the sub-grantee shall provide an estimated annual kWh usage and the duration of metered data.

Provide saving to Investment Ratio for the replacement refrigerator.

WAIVERS

There may be cases where it is the best interest of the client that a refrigerator be installed that does not meet the requirements of the Weatherization Assistance Program Refrigerator Replacement Policy. In these cases, the Weatherization Assistance Program Waiver Process must be followed.

APS Energy Wise Low Income Weatherization Program

APPENDIX B

Present Value Analysis SWG Low-Income Weatherization Program July 1, 1999 to June 31, 2000

The total amount of Southwest Gas Low Income funds spent in the fiscal 99/00 program year was \$166,218.58 (WACOG June report still not in). \$123,295 was spent on measures that are included in the analysis. \$42,923 was spent on health and safety and other repairs. \$22,069 was spent on administration. Total present value for funds spent was \$536,422. Saving to investment ratio for program is 3.22.

Below is a summary of how these figures were derived.

Average cost per measure:

The Southwest Gas Low-Income funds are used in conjunction with a number of other funding sources. This results in multiple funding sources being used in a high percentage of installed measures. This requires that an average cost per unit to complete a weatherization measure be determined, allowing these values to be applied to the Southwest Gas (SWG) funds spent on each measure. The following is a list of these average program costs for measures that used SWG funds.

Duct repair:

- Air Conditioned homes: 0.83 CFM50 per dollar.
- Evaporative cooling: 2 CFM50 per dollar.

Infiltration (air sealing and pressure balancing):

- Air Conditioned homes: 1.5 CFM50 per dollar.
- Evaporative cooling: 3.6 CFM50 per dollar.
- Pressure balancing: Approximately 3 Pascals average per home.

Attic insulation:

- Air Conditioned homes: Average existing insulation level of R-7, increasing to R-30 for \$.30 per square foot.
- Evaporative cooling: Average existing insulation level of R-2, increasing to R-19 for \$.25 per square foot.

Shade screens:

- \$3 per square foot

HVAC equipment replacement:

- AC/heating: 11.5 SEER AC and an 80% AFUE gas furnace (gas pack) average cost of \$2400.
- Heating only: 80% AFUE gas furnace average cost of \$1300.

Present value analysis

The next step was to determine present value for each of the measures listed above. The present value analysis presented used a discount rate of 3.7%. Life of measure used in present value analysis is listed with each measure.

APS Energy Wise Low Income Weatherization Program

Duct sealing: The following values were derived by utilizing the results from the APS study on duct leakage performed by Proctor Engineering. The saving values used are very conservative and could be as much as two times the value listed because of the interaction between duct leakage, house pressures, infiltration and system efficiency. Measure life of 20 years

Climate zone	AC/Forced air heating	Evap cooling/Forced air heating
II (Phoenix)	\$5.15 per CFM50 reduction	\$.65 per CFM50 reduction
III (Prescott)	\$3.3 per CFM50 reduction	\$2.50 per CFM 50 reduction
IV (Tucson)	\$3.70 per CFM50 reduction	\$.70 per CFM50 reduction
VI (Yuma)	\$9.00 per CFM50 reduction	\$.35 per CFM50 reduction

Infiltration: The following values were derived using REM/design Software. Measure life of 20 years

Climate zone	AC/Forced air heating	Evap/Forced air heating
II (Phoenix)	\$.29 per CFM50 reduction	\$.22 per CFM50 reduction
III (Prescott)	\$.59 per CFM50 reduction	\$.59 per CFM 50 reduction
IV (Tucson)	\$.26 per CFM50 reduction	\$.23 per CFM50 reduction
VI (Yuma)	\$.50 per CFM50 reduction	\$.14 per CFM50 reduction

Attic Insulation: The following values were derived using REM/design Software. Measure life of 20 years

Climate zone	AC/Forced air heating R-7 to R-30	Evap/Forced air heating R-2 to R-19
II (Phoenix)	\$1.02 per square foot	\$.23 per square foot
III (Prescott)	None completed	\$.70per square foot
IV (Tucson)	\$.85 per per square foot	\$.23 per square foot
VI (Yuma)	\$.98 per square foot	\$.20 per square foot

Shade Screens (AC only): The following values were derived using the REM/Design software. Measure life of 7 years

Climate zone	Shade Screens
II (Phoenix)	\$13 per square foot
III (Prescott)	None completed
IV (Tucson)	None completed
VI (Yuma)	None completed

HVAC Equipment Replacement: The following values were derived using the REM/Design software. Measure life of 15 years

Climate zone	11.5 SEER 80% AFUE	80% AFUE
II (Phoenix)	\$7685	\$745
III (Prescott)	None completed	None completed
IV (Tucson)	None completed	\$827

APS Energy Wise Low Income Weatherization Program

VI (Yuma)	None completed	None completed
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APS Energy Wise Low Income Weatherization Program

Dollars per measure spent

By determining the total dollars spent per measure and applying it to the average cost of measure and present value amount, an estimate of the total present value for the SWG low-income program can be determined. To achieve this, the total dollar amount of SWG funds spent per measure is multiplied by the average cost to determine the total amount of the measures completed with SWG funds. The total amount of measure completed is multiplied by the unit present value of the measure to estimate the present value for each measure. ***note, infiltration saving for pressure relief not included.**

Climate zone II: (Phoenix, Casa Grande)

Measure	Dollars spent on measure	Units completed per dollar	Total units completed	Present value per unit	Present value for measure
Duct repair/AC	\$24,618	.83 CFM50	20,433 CFM50	\$5.15	\$105,230
Duct repair/Evap	\$24,326	2 CFM50	48,652 CFM50	\$.65	\$31,624
Infiltration/AC	\$3,682	1.5 CFM50	5,523 CFM50	\$.28	\$1,602
Infiltration/Evap	\$10,936	3.6 CFM50	39,370 CFM50	\$.22	\$8,661
Attic insulation/AC	\$10,949	3.3 sq. ft.	36,132 sq. ft.	\$1.02	\$36,854
Attic insulation/Evap	\$8,090	4 sq. ft.	32,360 sq. ft.	\$.23	\$7,443
Shade screens	\$1,950	.333 per sq. ft.	649 sq. ft.	\$13	\$8,437
AC/Heating systems	\$14,682	.00041 (\$2,400 per system)	6	\$7,685	\$46,110
Heating systems	\$7,667	.00077 (\$1,300 per system)	5.9	\$745	\$4,396
Totals	\$106,900				\$250,357

Climate zone III: (Prescott, Payson, Miami, Douglas, Nogales)

Measure	Dollars spent on measure	Units completed per dollar	Total units completed	Present value per unit	Present value for measure
Duct repair/AC	None				
Duct repair/Evap	\$586	2 CFM50	1,172 CFM50	\$2.50	\$2,930
Infiltration/AC	None				
Infiltration/Evap	None				
Attic insulation/AC	None				
Attic insulation/Evap	\$302	4 sq. ft.	1,208 sq. ft.	\$.70	\$846
Shade screens	None				
AC/Heating systems	None				

APS Energy Wise Low Income Weatherization Program

Heating systems	None				
Totals	\$888				\$3,776

APS Energy Wise Low Income Weatherization Program

Climate zone IV: (Tucson, Camp Verde, Wickenburg, Kingman)

Measure	Dollars spent on measure	Units completed per dollar	Total units completed	Present value per unit	Present value for measure
Duct repair/AC	\$63	.83 CFM50	52 CFM50	\$3.70	\$192
Duct repair/Evap	\$6,611	2 CFM50	13,222 CFM50	\$.70	\$9,255
Infiltration/AC	None				
Infiltration/Evap	\$278	3.6 CFM50	1001 CFM50	\$.23	\$230
Attic insulation/AC	\$100	3.3 sq. ft.	330 sq. ft.	\$.85	\$281
Attic insulation/Evap	\$2,990	4 sq. ft.	11,996 sq. ft.	\$.23	\$2,759
Shade screens	None				
AC/Heating systems	None				
Heating systems	\$3,475	.00077 (\$1,300 per system)	2.6	\$827	\$2,150
Totals	\$13,517				\$14,867

Climate zone VI: (Yuma, Lake Havasu, Bullhead City)

Measure	Dollars spent on measure	Units completed per dollar	Total units completed	Present value per unit	Present value for measure
Duct repair/AC	\$104	.83 CFM50	86 CFM50	\$9.00	\$774
Duct repair/Evap	None				
Infiltration/AC	\$1,444	1.5 CFM50	2166 CFM50	\$.50	\$1,083
Infiltration/Evap	None				
Attic insulation/AC	\$442	3.3 sq. ft.	1,459 sq. ft.	\$.98	\$1,430
Attic insulation/Evap	None				
Shade screens	None				
AC/Heating systems	None				
Heating systems	None				
Totals	\$1,990				\$3,287

APS Energy Wise Low Income Weatherization Program

House of Refuge East

\$20,000 of SWG funds were transferred from the Tucson Urban League to the city of Mesa for the House of Refuge East project. This project was analyzed individually because of the specific information available for the project. A total of 86 homes were completed. The homes have AC and gas forced air furnaces. Duct repair, shade screen and pre-set thermostats were installed.

Present Value Analysis:

Duct repair: Duct leakage reduction was measured at between 150 CFM50 and 200 CFM50 per home. For the analysis, 150CFM50 reduction was used as an average per home.

- $86 \text{ homes} \times 150 \text{ CFM50} = 12,900 \text{ CFM50}$ total duct leakage reduction for the project.
- $12,900 \times \$5.15$ present value per CFM50 = \$66,435 present value for duct repair.

Shade screens: Shade screens were added to all homes where needed. A total of 3,300 sq. ft. of screens were install for \$10,000.

- $3,300 \times \$13$ present value per sq. ft. of screen = \$42,900 present value for shade screens.

Thermostats: All homes were equipped with a pre-set, non-adjustable thermostat at a total cost of \$4,900. The set points of existing thermostats were recorded during this project with majority set below 75°. The new thermostats are pre-set at 68° for heating and 78° for cooling. For this analysis, original set points of 70° for heating and 76° for cooling was used.

- Present value (10 year life) per home for a set back of 2° for heating and cooling equals \$1,800.
- $86 \times \$1,800 = \$154,800$ present value of pre-set thermostats.

The total present value for the House of Refuge East project is \$264,135.

Total Present Value⁽¹⁾

• Climate zone II	\$250,357
• Climate zone III	\$3,776
• Climate zone IV	\$14,867
• Climate zone VI	\$3,287
• House of Refuge	<u>\$264,135</u>
• Total	\$536,422

(1) The total number of homes in the studies for climate zones II, III, IV and VI is 150.

APS Energy Wise Low Income Weatherization Program

TERMS

CFM50: CFM50 is the airflow (in cubic feet per minute) from the Blower Door fan needed to create a change in building pressure of 50 Pascals (0.2 inches of water column). A 50 Pascal pressure is roughly equivalent to the pressure generated by a 20 mph wind blowing on the building from all directions. CFM50 is the most commonly used measure of building airtightness and gives a quick indication of the total air leakage in the building envelope.

CFM50 reduction: The reduction in the measured CFM50 airflow from a Blower Door test resulting from the completion of house or duct air sealing.

REM/Design Software: This user- friendly, yet sophisticated, software calculates heating, cooling, domestic hot water, lighting and appliance loads, consumption, and costs based on a description of the home's design and construction features as well as local climate and energy cost data. Additionally, **REM/Design™** is DOE-approved for Weatherization Assistance Programs in all states.

Weatherization: APPENDIX 4 - Cost Details

Weatherization Program - Projected Budget 2005 - 2007

For the portfolio roll up

	Planning & Administration		Program Marketing		Program Implementation		Rebates & Incentives		Training & Technical Assistance		Consumer Education		Ratio of non incentive to incentive cost
	Total												
WWeatherization 2005	\$ 1,100,000	\$ 75,000	\$ 5,000	\$ 5,000	\$ 50,000	\$ 955,000	\$ 10,000	\$ 5,000	15%				
WWeatherization 2006	\$ 1,100,000	\$ 75,000	\$ 5,000	\$ 5,000	\$ 50,000	\$ 955,000	\$ 10,000	\$ 5,000	15%				
WWeatherization 2007	\$ 1,100,000	\$ 75,000	\$ 5,000	\$ 5,000	\$ 50,000	\$ 955,000	\$ 10,000	\$ 5,000	15%				
Total 05-07	\$ 3,300,000	\$ 225,000	\$ 15,000	\$ 15,000	\$ 150,000	\$2,865,000	\$ 30,000	\$ 15,000	15%				

Budget Allocation

Planning and Administration

Program Marketing

Program Implementation

Rebates & Incentives

Training & Technical Assistance

Consumer Education

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses
Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Includes all dollars that go toward customer rebates and incentives. Includes bill assistance funds.

Includes all dollars that are used for energy efficiency training and technical assistance for program participants.

Includes dollars that are used to support customer's education about energy efficient improvements.

A	B	C	D	E	F	G	H	I
1	Weatherization: APPENDIX 5 - Energy Savings, Cost Effectiveness and Emissions							
2								
3								
4								
5								
6								
7	Weatherization	kWh	kW	2005	2006	2007	Lifetime mWh	kW
8		1,998	0.30	562	562	562	50,503	505
9	(1) An equivalent home is one that receives \$1,255 in APS weatherization funding.							
10								
11								
12	Weatherization Program Cost Effectiveness							
13	BCR Activity	Societal Benefit/Cost	Societal Net Benefit	Societal Benefits	Societal Costs			
14	Weatherization	0.72	(\$698,323)	\$1,807,460	\$2,505,782			
15	Externalities - emissions reductions based on 50,503 mWh saved							
16	SOx - 217 pounds				SOx		217 pounds	
17	NOx - 8,687 pounds				NOx		8,687 pounds	
18	CO2 - 46,311,516 pounds				CO2		46,311,251 pounds	
19	PM10 - 1,197 pounds				PM10		1,197 pounds	
20	Water - 11,767,266 gallons				Water Consumption		11,767,199 gallons	
21								
22					SOx		0.0043 lbs/MWh	
23					NOx		0.1720 lbs/MWh	
24					CO2		917 lbs/MWh	
25					PM10		0.0237 lbs/MWh	
26					Water Consumption		233 gal/MWh	

Attachment 5

Schools

APS Schools Program

Program Concept and Description

To provide assistance in reducing the energy used in public school buildings, including charter schools. All cost effective energy efficiency proposals will be considered with an initial emphasis on upgrading lighting, energy education, building operator training and design assistance.

The incentives that will be paid to schools for DSM measures are the same as for the non-school, non-residential DSM programs. However, the schools have a program budget of \$560,000 per year which is reserved exclusively for school use under this program. If schools over subscribe that budget, they can participate in the non-school, non-residential programs.

Target Market and Current Baseline Conditions

The target market is all K-12 public schools. There are an estimated 1,400 traditional public school buildings and 280 charter schools served by APS.

Measured baseline conditions are not available. An estimate is that 60% of the lights in existing schools could be economically upgraded to be more energy-efficient.

Program Eligibility

All public schools served by APS serving any grades, K - 12. A "school" is defined as a "school entity". In the case of the traditional public schools, a school entity is a public school district. In the case of Charter schools, a school entity is one that has a state charter.

Program Rationale

Thirty to forty percent of the School's electric use is for lighting. The Arizona Department of Commerce Energy Office ("Energy Office") and the Arizona Association of School Business Officials ("AASBO") agree that lighting upgrades offer the best opportunity to conserve energy in public schools, and is the most cost effective use for the majority of the school DSM funds. Other cost effective conservation projects will be considered.

Program Objectives

- Maximize the energy savings that can be attained with available DSM funds by incenting schools to upgrade lighting systems
- Provide educational and training materials to aid schools in other energy conservation projects.
- Provide training for building operators.
- Provide design assistance to aid schools in identifying energy savings opportunities.
- Provide financial assistance for other cost effective DSM projects.

APS Schools Program

Products and Services Provided

- Incentives for lighting upgrades
- Educational materials
- Building operator training
- Evaluation and implementation assistance. APS, through a third party contractor, will provide assistance in identifying and implementing energy conservation projects to schools lacking the resources to do it themselves.
- Design assistance
- Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff. See Appendix 2 for additional incentive information.
- Assistance in implementing other cost effective energy conservation programs

Delivery Strategy and Administration

- APS will deliver information and promotional materials to School decision makers. A proactive effort to reach small and rural schools as well as large metro schools.
- APS will work with the AASBO, the School Facilities Board (SFB), the Arizona State Board for Charter Schools ("ASBCS") and the Energy Office to identify schools that are considering projects that might qualify for assistance under this program.
- APS and a third party contractor will provide assistance in identifying and scoping projects as needed within the limitations of economically available resources.
- APS and the third party contractor will provide assistance in managing the design and implementation of the projects as needed within the limits of economically available resources.

See Appendix 6 for a flow chart illustrating the delivery strategy.

- Distribution of funds:

In accordance with the recommendations of school representatives, Schools will be served primarily on a first come, first served basis. Schools will be invited to submit applications. All applications received by the due date will be considered. Those not conforming to the application rules will be rejected. Those that conform to the application rules and have a benefit to cost ratio of at least 1.0 will be funded primarily on a first come, first served basis until the funding limit is reached. Applications that conform to program rules and have a benefit to cost ratio of at least 1.0 and cannot be funded in the current funding cycle will be given priority in the next funding cycle.

Upon approval of an application, APS will reserve the funding. When APS receives approved documentation that the work has been satisfactorily completed, the school will be paid the amount approved on the application. If the completed work is less than approved on the application, APS will pay only for the work that is satisfactorily completed. If there is more work that is completed in a satisfactory manner than was approved in the application, APS may at its option choose to pay for the additional work. APS is not obligated to pay for more than is approved on the application.

APS Schools Program

To facilitate an equitable distribution of funds these rules for funding school entities will be followed.

- School entities chosen to receive funding will be limited to a maximum of \$15 per student or \$25,000 per school per year, whichever is less.
- If there are insufficient applications to use all the available funds, APS may choose to award additional funding to schools with qualifying proposals, even if that additional funding exceeds the limits established for a school entity.
- Schools that request more than the maximum allowed by this program cannot participate in the non-residential DSM programs until this program is fully subscribed.
- APS, with the assistance of a third party contractor, will make a good faith effort to assist schools that do not have the resources to submit an application for funding. The assistance may include an assessment of the school property to determine the most viable energy efficiency proposal, working with the school to submit the application for funding and identifying capable contractors.

Marketing and Communications

- Provide incentives for energy-efficiency improvements with the emphasis on lighting upgrades.
- Coordinate with the third party contractor to inform school decision makers about the availability of the program, how it works and how to participate.
- Provide technical and management assistance to small schools to assist in identifying and implementing projects.
- Provide a "Schools" section on the APS website to deliver updated information on conservation tips and notable projects.
- Provide online energy analysis software that small schools can use to assess the impacts of energy conservation measures such as efficient air conditioners and lighting.
- Deliver educational materials on school energy use and ways to conserve to the decision makers. Work with the AASBO, ASBCS and others as appropriate to identify the decision makers.
- Email decision makers with tips and updated information.

Program Implementation Schedule

Program Activity	Timeline											
	2005				2006				2007			
ACC Approval												
Design and print collateral & supporting materials												
Notify schools of program												
Initial assessment of potential projects												
Assist smaller schools in preparing project applications												
Review and approve project applications												
Continuous program implementation												
Evaluate installations												
Pay incentives												

APS Schools Program

Monitoring and Evaluation Plan

- Work with the third party contractor to do on-site inspections of selected schools to spot-check lighting installations and verify operating parameters.
- Use accepted engineering calculations to determine energy savings due to lighting upgrades.
- Survey decision makers who received the educational materials to assess what impact they had on energy use.
- For non lighting improvements, review calculated savings and spot check installations to confirm calculated savings.

Program Budget

This budget is based on the contributions the schools will make through the DSM funding mechanisms. This money is dedicated to Schools and cannot be used by others. Schools, however, will be allowed to participate for an additional \$6.5 million in funds allocated for other non residential DSM programs.

- 2005: \$455,000
- 2006: \$560,000
- 2007: \$665,000

To provide a sense of the impact on schools, consider that if all the incentive funds were to be spent on classroom lighting upgrades; this budget would fund lighting upgrades for 1,900 class rooms a year.

See Appendix 1 for additional budget information.

Estimated Energy Savings

Lighting is about 30%-40% of a school's electric use. The schools have indicated that most of the funds will be spent on lighting upgrades. The savings estimate is based on the most common lighting upgrades, recognizing that other measures may be approved and actual savings will depend on which measures are installed. Savings are based on data from the End Use Data Acquisition Project which indicates that school lighting is in use 3,300 hours per year. See Appendix 3 for details.

Measure	Annual Estimated savings per light fixture		Equivalent fixtures converted per year			Estimated total savings	
	kWh	kW	2005	2006	2007	Lifetime mWh	kW
Upgrade T12 light fixtures to T8 fixtures	101	0.031	25,912	28,208	35,027	162,069	2,764

APS Schools Program

Program Cost Effectiveness

See Appendix 4 for details.

Total APS Program Cost 2005-2007	Lifetime Program Cost per kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$1,680,000	\$0.010	\$4,535,799	\$3,744,174	1.21

The Societal benefits do not include the monetary value of the environmental externalities that are saved. The externalities are shown in the table below, along with the physical quantities of the emissions reduced and resources conserved. These are savings that will be realized over the life of the measures. The monetary value is not quantified. See Appendix 5 for details.

Externalities - emissions reductions based on 162,069MWh saved		
SO _x	697	Pounds
NO _x	27,876	Pounds
CO ₂	148,617,273	Pounds
PM ₁₀	3,841	Pounds
Water Consumption	36,394,367	Gallons

APS Schools Program

APPENDIX 1

School Program – Projected Budget 2005 - 2007

APPENDIX 2

Prescriptive Incentives for each DSM measure – Existing and New.

APPENDIX 3

Schools – Energy Savings Calculations

APPENDIX 4

Schools – Program cost effectiveness calculations

APPENDIX 5

Schools – Societal, or Emission Reduction, benefits

APPENDIX 6

Schools DSM program delivery model

[illegible]

Prescriptive Lighting Incentive Worksheet - Existing 2005

Equipment Type	Replace	Incentive
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Standard T8 or T5 Electronic Ballast Fixtures		
2-foot to 4-foot lamp	T12 magnetic ballast	\$ 5.00 per lamp
8-foot lamp	T12 magnetic ballast	\$ 8.00 per lamp

Delamping		
3 Lamp T8	4 Lamp T12	\$7.00 per fixture
2 Lamp T8 or T5	4 Lamp T12	\$13.00 per fixture
2 Lamp T8 or T5	3 Lamp T12	\$7.00 per fixture
1 Lamp T8 or T5	2 Lamp T12	\$7.00 per fixture
3 Lamp T8 or T5	4 Lamp T8	\$3.00 per fixture
2 Lamp T8 or T5	4 Lamp T8	\$7.00 per fixture
2 Lamp T8 or T5	3 Lamp T8	\$3.00 per fixture
1 Lamp T8 or T5	2 Lamp T8	\$3.00 per fixture

Compact Fluorescent Lamps (CFL)		
All sizes	Incandescent	\$1.75 per lamp

Exit Signs (LED or Electroluminescent)		
Double or Single Face	Incandescent or CFL	\$25.00 per unit

Occupancy Sensors & Daylighting Controls		
All Sensor Mountings		\$40.00 per sensor

Equipment Type	Replace	Incentive
----------------	---------	-----------

Premium T8 Electronic Ballast Fixtures		
2-foot to 4-foot lamp	T12 magnetic ballast	\$8.00 per lamp
8-foot lamp	T12 magnetic ballast	\$10.00 per lamp

T5 F28 HO Electronic Ballast		
4 Lamp T5	Metal Halide	\$75.00 per fixture

Outdoor Lighting		
CFL ≤ 26 W	Incandescent	\$2.50 per fixture
CFL > 26 W ≤ 55 W	Incandescent	\$3.50 per fixture
CFL > 55 W	Incandescent	\$5.00 per fixture
CFL Flood	Halogen PAR	\$3.50 per fixture
High Pressure Sodium	Halogen PAR	\$25.00 per fixture
High Pressure Sodium	Mercury Vapor	\$10.00 per fixture
High Pressure Sodium	Metal Halide	\$10.00 per fixture

Prescriptive Lighting Incentive Worksheet - New 2005

Equipment Type	Incentive
Premium T8 Electronic Ballast Fixtures	
2-foot to 4-foot lamp	\$1.50 per lamp
8-foot lamp	\$2.50 per lamp

T5 Electronic Ballast	
1 Lamp T5 (2' - 4')	\$3.00 per fixture
2 Lamp T5 (2' - 4')	\$7.00 per fixture
4 Lamp T5 HO F28	\$75.00 per fixture

Outdoor Lighting	
CFL ≤ 26 W	\$2.50 per fixture
CFL > 26 W ≤ 55 W	\$3.50 per fixture
CFL > 55 W	\$5.00 per fixture
High Pressure Sodium	\$10.00 per fixture

Equipment Type	Incentive
Compact Fluorescent Lamps (CFL)	
All sizes	\$1.75 per lamp
Exit Signs (LED or Electroluminescent)	
Double or Single Face	\$25.00 per unit
Occupancy Sensors	
All Sensor Mountings	\$40.00 per sensor
Daylighting Controls	\$100.00 per unit

Prescriptive Cooling Incentive Worksheet - Existing 2005

Equipment Type	Size Category	Qualifying Efficiency	Incentive		Efficiency Incentive
Air Cooled AC Units (Split System and Single Package Units)	≤ 5 Tons	11.6 EER	\$50.00	per ton	\$30.00 per EER point over 11.6 per ton
	> 5 Tons ≤ 10 Tons	11.4 EER	\$50.00	per ton	\$30.00 per EER point over 11.4 per ton
	> 10 Tons	11.2 EER	\$25.00	per ton	\$30.00 per EER point over 11.2 per ton
Water Cooled Chillers	All Sizes	.61 kW/Ton	\$10.00	per ton	\$200.00 per kW/Ton under .61 per ton
Air Cooled Chillers	< 150 Tons	1.25 kW/Ton	\$10.00	per ton	\$200.00 per kW/Ton under 1.25 per ton
	≥ 150 Tons	1.25 kW/Ton	\$15.00	per ton	\$200.00 per kW/Ton under 1.25 per ton

Quality Installation	≤ 10 Tons	NA	\$125.00	per ton	Size Category = Total Project Capacity
	> 10 Tons ≤ 25 Tons	NA	\$100.00	per ton	Size Category = Total Project Capacity
	> 25 Tons	NA	\$75.00	per ton	Size Category = Total Project Capacity
Diagnostic Tune Up	≤ 5 Tons	NA	\$100.00	per ton	Size Category = Total Project Capacity
	> 5 Tons ≤ 12.5 Tons	NA	\$75.00	per ton	Size Category = Total Project Capacity
	> 12.5 Tons	NA	\$50.00	per ton	Size Category = Total Project Capacity
Programmable Thermostats	NA	NA	\$50.00	per T Stat	
Cool Roofs	NA	NA	\$0.50	per Sq Ft	Both roof coatings and single membrane applications that have a minimum solar reflectance of 0.65 are eligible.

Prescriptive Cooling Incentive Worksheet - New

2005

Equipment Type	Size Category	Qualifying Efficiency	Incentive	Efficiency Incentive
Air Cooled AC Units (Split System and Single Package Units)	≤ 5 Tons	11.6 EER	\$50.00	per ton per EER point over 11.6 per ton
	> 5 Tons ≤ 10 Tons	11.4 EER	\$50.00	per ton per EER point over 11.4 per ton
	> 10 Tons	11.2 EER	\$25.00	per ton per EER point over 11.2 per ton
Water Cooled Chillers	All Sizes	.61 kW/Ton	\$10.00	per kW/Ton under .61 per ton
Air Cooled Chillers	< 150 Tons	1.25 kW/Ton	\$10.00	per kW/Ton under 1.25 per ton
	≥ 150 Tons	1.25 kW/Ton	\$15.00	per kW/Ton under 1.25 per ton
Quality Installation	≤ 10 Tons	NA	\$125.00	Size Category = Total Project Capacity
	> 10 Tons ≤ 25 Tons	NA	\$100.00	Size Category = Total Project Capacity
	> 25 Tons	NA	\$75.00	Size Category = Total Project Capacity
Programmable Thermostats	NA	NA	\$50.00	per T Stat
Cool Roofs	NA	NA	\$0.50	per Sq Ft Both roof coatings and single membrane applications that have a minimum solar

Prescriptive Motor Incentive Worksheet 2005

Premium Efficiency Motors							
Horse Power	3600 RPM		1800 RPM		1200 RPM		Incentive/HP
	Open	Closed	Open	Closed	Open	Closed	
1	77.6%	77.6%	85.7%	85.0%	82.2%	82.7%	\$5
1.5	85.4%	85.1%	86.9%	87.2%	86.2%	87.3%	\$5
2	86.7%	86.1%	87.5%	87.4%	87.1%	88.1%	\$5
3	86.1%	87.6%	89.8%	89.7%	89.3%	89.0%	\$5
5	88.5%	89.5%	90.4%	90.2%	90.1%	90.0%	\$5
7.5	89.7%	90.5%	91.7%	91.5%	91.5%	91.4%	\$5
10	90.4%	91.7%	92.0%	91.8%	92.0%	91.7%	\$5
15	91.0%	91.8%	93.2%	92.7%	92.7%	92.5%	\$5
20	91.8%	92.1%	93.3%	93.3%	92.9%	92.5%	\$5
25	92.9%	92.9%	94.0%	93.8%	93.7%	93.4%	\$5
30	93.3%	92.7%	94.0%	93.9%	94.0%	93.7%	\$5
40	93.6%	93.4%	94.5%	94.6%	94.5%	94.3%	\$5
50	93.7%	93.9%	94.9%	94.9%	94.6%	94.4%	\$5
60	94.3%	94.3%	95.6%	95.2%	95.1%	94.9%	\$5
75	94.4%	94.5%	95.3%	95.4%	95.3%	94.9%	\$5
100	94.6%	94.8%	95.9%	95.5%	95.5%	95.1%	\$5
125	94.7%	95.2%	95.9%	95.4%	95.7%	95.1%	\$5
150	94.8%	95.5%	96.1%	95.8%	95.9%	95.9%	\$5
> 150	95.1%	95.7%	96.2%	96.3%	96.0%	95.8%	\$5

Efficiency standards are for all motors less than or equal to the indicated horsepower (up to the lower sized motor).

For example, for a 4 HP motor, use the efficiency standard for a 5 HP motor.

Variable Speed Drives	
Horse Power	Incentive per HP
All Sizes	\$ 50.00

Prescriptive Refrigeration Incentive Worksheet

2005

Refrigeration Measures		
Measure	Unit	Incentive/Unit
Strip Curtains on Walk-Ins	Linear Foot	\$5.00
Night Covers	Linear Foot	\$10.00
Anti-Sweat Heater Controls	Door	\$200.00
Reach in Cooler Controls	Reach in Cooler	\$100.00
High Efficiency Ice Makers*		
High Efficiency Reach-in Freezer**	Ice Maker	\$50.00
High Efficiency Reach-in Refrigerators**	Freezer	\$75.00
	Refrigerator	\$75.00
High Efficiency Evap Fan Motors		
PSC Motor	Motor	\$15.00
EC Motor	Motor	\$25.00
High Efficiency Vending Machines		
Beverage Case Controls	Vending Machine	\$100.00
Snack Machine Controls	Vending Machine	\$25.00

** Must meet the Federal Energy Management Program Recommended Efficiency levels of 110 lbs of ice per kWh.

** Must be Energy Star to Qualify.

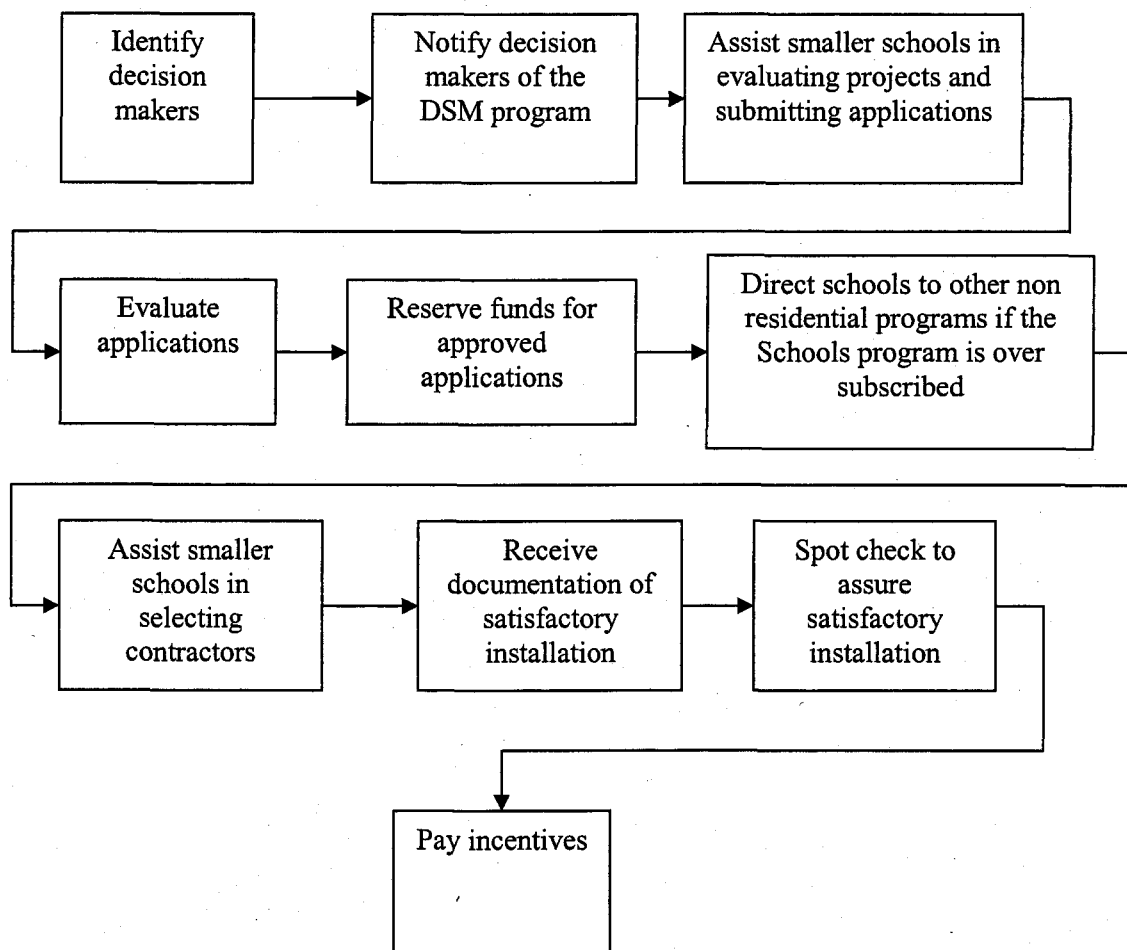
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Appendix 3: Schools - Energy Savings Calculations																			
2																				
3	Lighting Measures: T8 Fluorescents with Electronic Ballasts	Demand kW savings per unit	Peak Coincidence Factor	Annual Energy kWh savings per unit	# unit 2005	# unit 2006	# unit 2007	TOTAL kW 05	TOTAL kW 06	TOTAL kW 07	TOTAL KW Savings 06-07	TOTAL Lifetime kWh 05	TOTAL Lifetime kWh 06	TOTAL Lifetime kWh 07	TOTAL Lifetime kWh savings 05-07	Total Program Cost 2005-2007	\$/Lifetime kWh	Total Units 2005-2007	Notes	
4		0.031	21%	101	25,912	28,208	35,027	803.3	874.4	1065.8	2763.6	18,47,108.016	51,282,144	63,679,086	162,069,246	\$1,680,000	0.010	89,147		

	A	B	C	D	E	F	G	H	I	J	K	L
1	Appendix 4: Schools - Program cost effectiveness calculations											
2												
3	Program cost 2005	Program cost 2006	Program cost 2007	Total APS program cost	Lifetime kWh	Cost/lifetime kWh	Societal benefits per unit	Total units	Total Societal Benefits	Societal Costs per unit	Total Societal Costs	Societal BC ratio
4	\$465,000	\$560,000	\$655,000	\$1,680,000	169,069,246	\$0.010	\$51	89,147	\$4,535,799	\$42	\$3,744,174	1.21

	A	B	C	D	E	F	G	H
1	Appendix A5: Schools - Societal, or Emission Reduction, benefits							
2								
3								
4	Emission	MWh	lbs/MWh	Total lbs reduced				
5	SOx	162,069	0.0043	697				
6	NOx	162,069	0.172	27,876				
7	CO2	162,069	917	148,617,273				
8	PM10	162,069	0.0237	3,841				
9								
10			Gal/MWh					
11								
12	Water consumption	156,199	233	36,394,367				

APPENDIX 6

Schools DSM program delivery model



Attachment 6

Non-Residential Existing Facilities

Non-Residential DSM Program for Existing Facilities

Program Concept and Description

- Provide prescriptive incentives for owners and operators of large non-residential facilities for energy-efficiency improvements in lighting, HVAC ("heating, ventilation, and air conditioning"), motors, and refrigeration applications:
 - Provide subsidies for covering the cost of a retro-commissioning study that uses a systematic process to improve and optimize an existing building's operations and to support those improvements with enhanced documentation and training;
 - Provide incentives to implement retro-commissioning and HVAC system tune-up measures recommended by the study;
 - Provide educational and promotional pieces designed to assist facility and business owners and operators in making decisions to improve the energy-efficiency of their facilities;
 - Qualify and promote contractors that have gone through commercial qualified contractor training and meet APS' standards for installation and operation of high efficiency systems; and
- Provide custom efficiency incentives to implement energy-efficiency measures not covered by the prescriptive incentives offered in this program.

Target Market and Current Baseline Conditions

- Equipment replacement and retrofit projects for large existing non-residential APS customers with a maximum monthly billed demand of greater than 200 kW in the past twelve months of billing history.
 - Specifically target and encourage energy-efficiency retrofit projects that would otherwise not likely occur. Retrofit is defined here as motivating a customer with an incentive, to replace a working, high energy-using piece of equipment with an energy-efficient piece of equipment that they otherwise would not have replaced. In other words, the DSM incentive is a major influence on their decision to make the energy-efficiency upgrade. Retrofit efficiency projects will be managed and tracked separately as a part of this program.
 - Target equipment replacement projects to encourage energy-efficiency upgrades when it is time to replace a less efficient piece of equipment at the end of its useful life.
- Types of customers that are typically this size include, but are not limited to:
 - Large Offices
 - Large Retail
 - Large Groceries
 - Resorts/Large Hotels
 - College/University
 - Inpatient Healthcare
- Lighting, HVAC, Refrigeration, and Other Miscellaneous Electric Loads comprise the energy loads used by these customers. The following is a breakdown of the energy loads based on the 1996 APS End-Use Data Acquisition Project ("EUDAP"):

	<u>Lighting</u>	<u>HVAC</u>	<u>Refrigeration</u>	<u>Other</u>
Large Offices	28%	31%	nil	41%
Large Retail	44%	31%	nil	25%
Large Groceries	22%	15%	52%	11%
Resorts/Large Hotels	35%	51%	nil	14%
College/University	41%	46%	2%	11%
Inpatient Healthcare	38%	43%	nil	19%

APS has received approval, in ACC Decision No. 67816, to conduct an updated baseline study to obtain current end-use energy market knowledge and information for all segments. This updated information will replace the 1996 EUDAP information.

Other energy loads includes plug loads, water heating, process heating and cooling, cooking, and any other miscellaneous electric energy that a nonresidential customer may consume.

Program Eligibility

- Existing non-residential customers & retrofit facilities within APS service territory with a maximum monthly billed demand of greater than 200 kW in the past twelve months of billing history.

Non-Residential DSM Program for Existing Facilities

Program Rationale

- Increase the energy-efficiency of the customers' facilities within the large customer segment.
- Increase the awareness and knowledge of facility and business owners and operators on the benefits of efficiency measures promoted by the program; and
- Increase the knowledge of building operators and facility maintenance technicians about the benefits of improving the energy-efficiency of central HVAC systems through equipment tune-ups, control system adjustment and calibration, air and water system balancing, refrigeration cycle adjustments, and air system tune-ups.

Program Objectives

- Provide Demand Side Management opportunities for existing large non-residential customers:
 - Promote the installation of high-efficiency technologies including, but not limited to: lighting, HVAC equipment, motors, and refrigeration systems;
 - Identify and pursue retrofit opportunities within this market segment.
 - Increase the efficiency of existing facilities through the tune-up and retro-commissioning of large central HVAC systems, as well as other end-use measures;
 - Promote integrated solutions to the extent possible;
 - Offer Commercial Qualified Contractor training to meet APS' standards for installation and operation of high efficiency systems;

Products and Services Provided

- Education and promotional efforts aimed at facility and business owners and operators about the benefits of energy-efficiency improvements and improved systems performance including educational brochures, program promotional material and website content;
- Prescriptive incentives are summarized in Appendix 1. Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.
- The maximum DSM incentive payout (for all prescriptive and custom incentives combined) is capped at \$300,000 total per customer per budget year in this program. However, If there are insufficient applications to use all of the available funds in this program in a given budget year, APS may choose to award additional funding to customers with qualifying proposals even if that additional funding exceeds their cap established in this program.
- The possibility of including 3rd-party (not APS or Pinnacle West) financing will be explored as a potential future offering in this program. In general, some municipal and local government agencies lack capital to invest in energy-efficiency improvements, or choose to invest this capital in business-related purchases over energy-efficiency upgrades. All costs associated with this financing option will be from DSM funds.

Custom Efficiency Measures

- Incentives will be provided to building owners and managers to adopt custom energy-efficiency measures outside of the prescriptive efficiency list.
- The Custom incentive provided by the program is based on a one-time payout on the annual energy savings of the installed measure(s). This one-time payout is equal to \$0.11 per kWh saved.
- The maximum custom efficiency incentive payout is limited to 50% of the energy-efficiency related project costs, and shall not exceed the total customer incentive amount available in this program. The energy-efficiency related project costs are defined as the incremental costs associated with implementing the energy savings measures.
- Partial reimbursement of feasibility studies will be provided to participating customers to examine creative and innovative measures that might not be covered by prescriptive incentives. The incentive will cover up to 50% of the cost of the study with a maximum incentive limit of \$10,000 for the study. A feasibility study is defined as an energy simulation or energy study that identifies energy conservation measures and calculates the related annual energy savings as a result of installing these measures.
- For consideration to participate in APS' custom efficiency program applicants must provide an energy simulation or adequate spreadsheet analysis that estimates the annual energy savings in support of the incentive amount requested for installing energy-efficient measures. This simulation or analysis must include:

Non-Residential DSM Program for Existing Facilities

- Adequate documentation (list all assumptions and inputs),
- Be easily interpreted by a third party reviewer,
- Demonstrate annual energy savings (in kWh) over a standard design (e.g., American Society of Heating, Refrigerating, and Air-conditioning Engineers - ASHRAE standard 90.1).
- The energy simulation may be part of Leadership in Energy & Environmental Design ("LEED") certification.
- The simulation/analysis and its results will be reviewed and approved by APS or its implementation contractor ("IC") to verify the savings validity and establish the incentive amount. Furthermore, APS reserves the right to determine the final energy savings estimate and associated incentive payout amount(s) in this DSM program.

Retro-Commissioning Incentives

- Incentives will be provided for retro-commissioning studies, covering up to 50% of the cost of the study with a maximum incentive limit of \$10,000 for the study.
- The incentive provided for implementing the retro-commissioning study recommendations is based on a one-time payout on the annual energy savings of the installed measure(s). This one-time payout is equal to \$0.11 per kWh saved.

Note: All incentives considered in this DSM program will be paid after completion of the project and verification that the energy-efficiency measure(s) were installed.

Delivery Strategy and Administration

- APS issues RFP and selects implementation contractor;
- Implementation contractor provides program design, administration, marketing, vendor and retro-commissioning contractor referrals, application and incentive processing, participation tracking and reporting, quality control, and technical support;
- APS/IC conduct commercial qualified contractor training program to provide a pool of trained and "Qualified" contractors and service technicians to deliver energy-efficiency products;
- APS/IC market and promote program and recruit customers;
- See the program implementation flow chart included in Appendix 2

Marketing and Communications

- APS/IC provides marketing including, website content, media ads, etc.
- IC conducts direct marketing to customers under the direction of APS, fielding of customer inquiries, and promotion of program products and services.

Program Implementation Schedule

- The following table shows the estimated timeline for key program activities by quarter.

	2005				2006				2007			
Collaborative Meetings & Program Buy-in												
Program Pre-approval Filed with ACC												
Issue RFP for IC Contractor												
Program Approval by ACC												
Review and Select IC Contractor												
Begin Program Implementation and Promotion to Contractors, Trade Allies & Customers												
Continuous Program Implementation												
Process Evaluation (on going)												
Program Redesign (as needed)												
Savings Verification												

* Selection of the IC, as a result of the RFP process, will be completed after ACC approval of the program, and the timeline will be adjusted accordingly.

Non-Residential DSM Program for Existing Facilities

Monitoring and Evaluation Plan

- The strategy for monitoring and evaluation will involve integrated evaluation. In this approach, data are collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data at a lower cost.
- Field verification will be utilized by the IC where applicable.
- All retrofit applications will be tracked and differentiated from equipment replacement applications.

Program Budget

- The following is the Non-Residential DSM program budget for Large Existing & Retrofit customers, which includes planning & administration, implementation, incentives, consumer education, training & technical assistance, and marketing:
 - 2005: \$1.8 million
 - 2006: \$2.3 million
 - 2007: \$2.7 million
- See Appendix 3 for more information about the program budget.

Estimated Energy Savings

The total program cost per lifetime kWh is \$0.0088, which equals \$6,760,074 total program costs / 767,639,300 lifetime kWh.

The following Table shows the estimated energy savings for the program:

Year	Estimated Energy Savings (kWh)	Estimated Energy Savings (\$)
2005	2,029	184,802,000
2006	2,775	252,720,800
2007	3,625	330,116,500
Program Total 2005-2007	8,430	767,639,300

- See Appendix 4 for more detailed information on savings estimates.

Program Cost Effectiveness

The Large Existing Non-Residential DSM program is effective with a Societal Cost Test benefit/cost ratio of 2.89.

Total Program Cost 2005-2007	\$ Lifetime kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$6,760,074	\$0.0088	\$24,438,883	\$8,451,246	2.89

In addition to the savings shown above, it is estimated that the program will produce these environmental benefits over the life of the measures:

Water Savings*	188,759,983 gal.
SOx	3,301 lbs.
NOx	132,034 lbs.
CO2	703,925,342 lbs.
PM10	18,193 lbs.

* Total water savings including both utility and customer savings.

Non-Residential DSM Program for Existing Facilities

Appendix 1 – Incentive levels by Measure

See accompanying Excel spreadsheet for incentive levels

Prescriptive Lighting Incentive Worksheet 2005

Equipment Type	Replace	Incentive
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Standard T8 or T5 Electronic Ballast Fixtures		
2-foot to 4-foot lamp	T12 magnetic ballast	\$ 5.00 per lamp
8-foot lamp	T12 magnetic ballast	\$ 8.00 per lamp

Delamping		
3 Lamp T8	4 Lamp T12	\$7.00 per fixture
2 Lamp T8 or T5	4 Lamp T12	\$13.00 per fixture
2 Lamp T8 or T5	3 Lamp T12	\$7.00 per fixture
1 Lamp T8 or T5	2 Lamp T12	\$7.00 per fixture
3 Lamp T8 or T5	4 Lamp T8	\$3.00 per fixture
2 Lamp T8 or T5	4 Lamp T8	\$7.00 per fixture
2 Lamp T8 or T5	3 Lamp T8	\$3.00 per fixture
1 Lamp T8 or T5	2 Lamp T8	\$3.00 per fixture

Compact Fluorescent Lamps (CFL)		
All sizes	Incandescent	\$1.75 per lamp

Exit Signs (LED or Electroluminescent)		
Double or Single Face	Incandescent or CFL	\$25.00 per unit

Occupancy Sensors & Daylighting Controls		
All Sensor Mountings		\$40.00 per sensor
Daylighting Controls		\$100.00 per unit

Equipment Type	Replace	Incentive
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Premium T8 Electronic Ballast Fixtures		
2-foot to 4-foot lamp	T12 magnetic ballast	\$8.00 per lamp
8-foot lamp	T12 magnetic ballast	\$10.00 per lamp

T5 F28 HO Electronic Ballast		
4 Lamp T5	Metal Halide	\$75.00 per fixture

Outdoor Lighting		
CFL ≤ 26 W	Incandescent	\$2.50 per fixture
CFL > 26 W ≤ 55 W	Incandescent	\$3.50 per fixture
CFL > 55 W	Incandescent	\$5.00 per fixture
CFL Flood	Halogen PAR	\$3.50 per fixture
High Pressure Sodium	Halogen PAR	\$25.00 per fixture
High Pressure Sodium	Mercury Vapor	\$10.00 per fixture
High Pressure Sodium	Metal Halide	\$10.00 per fixture

Prescriptive Cooling Incentive Worksheet

2005

Equipment Type	Size Category	Qualifying Efficiency	Incentive	Efficiency Incentive
Air Cooled AC Units (Split System and Single Package Units)	≤ 5 Tons	11.6 EER	\$50.00	\$30.00 per EER point over 11.6 per ton
	> 5 Tons ≤ 10 Tons	11.4 EER	\$50.00	\$30.00 per EER point over 11.4 per ton
	> 10 Tons	11.2 EER	\$25.00	\$30.00 per EER point over 11.2 per ton
	All Sizes	.61 kW/Ton	\$10.00	\$200.00 per kW/Ton under .61 per ton
Water Cooled Chillers	< 150 Tons	1.25 kW/Ton	\$10.00	\$200.00 per kW/Ton under 1.25 per ton
	≥ 150 Tons	1.25 kW/Ton	\$15.00	\$200.00 per kW/Ton under 1.25 per ton
Air Cooled Chillers	≤ 10 Tons	NA	\$125.00	Size Category = Total Project Capacity
	> 10 Tons ≤ 25 Tons	NA	\$100.00	Size Category = Total Project Capacity
	> 25 Tons	NA	\$75.00	Size Category = Total Project Capacity
	≤ 5 Tons	NA	\$100.00	Size Category = Total Project Capacity
Diagnostic Tune Up	> 5 Tons ≤ 12.5 Tons	NA	\$75.00	Size Category = Total Project Capacity
	> 12.5 Tons	NA	\$50.00	Size Category = Total Project Capacity
	NA	NA	\$50.00	per T Stat
Programmable Thermostats	NA	NA	\$0.50	per Sq Ft
Cool Roofs	NA	NA		Both roof coatings and single membrane

Prescriptive Motor Incentive Worksheet

2005

Premium Efficiency Motors									
Horse Power	3600 RPM		1800 RPM		1200 RPM		Incentive/HP		
	Open	Closed	Open	Closed	Open	Closed			
1	77.6%	77.6%	85.7%	85.0%	82.2%	82.7%	\$5		
1.5	85.4%	85.1%	86.9%	87.2%	86.2%	87.3%	\$5		
2	86.7%	86.1%	87.5%	87.4%	87.1%	88.1%	\$5		
3	86.1%	87.6%	89.8%	89.7%	89.3%	89.0%	\$5		
5	88.5%	89.5%	90.4%	90.2%	90.1%	90.0%	\$5		
7.5	89.7%	90.5%	91.7%	91.5%	91.5%	91.4%	\$5		
10	90.4%	91.7%	92.0%	91.8%	92.0%	91.7%	\$5		
15	91.0%	91.8%	93.2%	92.7%	92.7%	92.5%	\$5		
20	91.8%	92.1%	93.3%	93.3%	92.9%	92.5%	\$5		
25	92.9%	92.9%	94.0%	93.8%	93.7%	93.4%	\$5		
30	93.3%	92.7%	94.0%	93.9%	94.0%	93.7%	\$5		
40	93.6%	93.4%	94.5%	94.6%	94.5%	94.3%	\$5		
50	93.7%	93.9%	94.9%	94.9%	94.6%	94.4%	\$5		
60	94.3%	94.3%	95.6%	95.2%	95.1%	94.9%	\$5		
75	94.4%	94.5%	95.3%	95.4%	95.3%	94.9%	\$5		
100	94.6%	94.8%	95.9%	95.5%	95.5%	95.1%	\$5		
125	94.7%	95.2%	95.9%	95.4%	95.7%	95.1%	\$5		
150	94.8%	95.5%	96.1%	95.8%	95.9%	95.9%	\$5		
> 150	95.1%	95.7%	96.2%	96.3%	96.0%	95.8%	\$5		

Efficiency standards are for all motors less than or equal to the indicated horsepower (up to the lower sized motor).

For example, for a 4 HP motor, use the efficiency standard for a 5 HP motor.

Variable Speed Drives		
Horse Power	Incentive per HP	
All Sizes	\$	50.00

Prescriptive Refrigeration Incentive Worksheet

2005

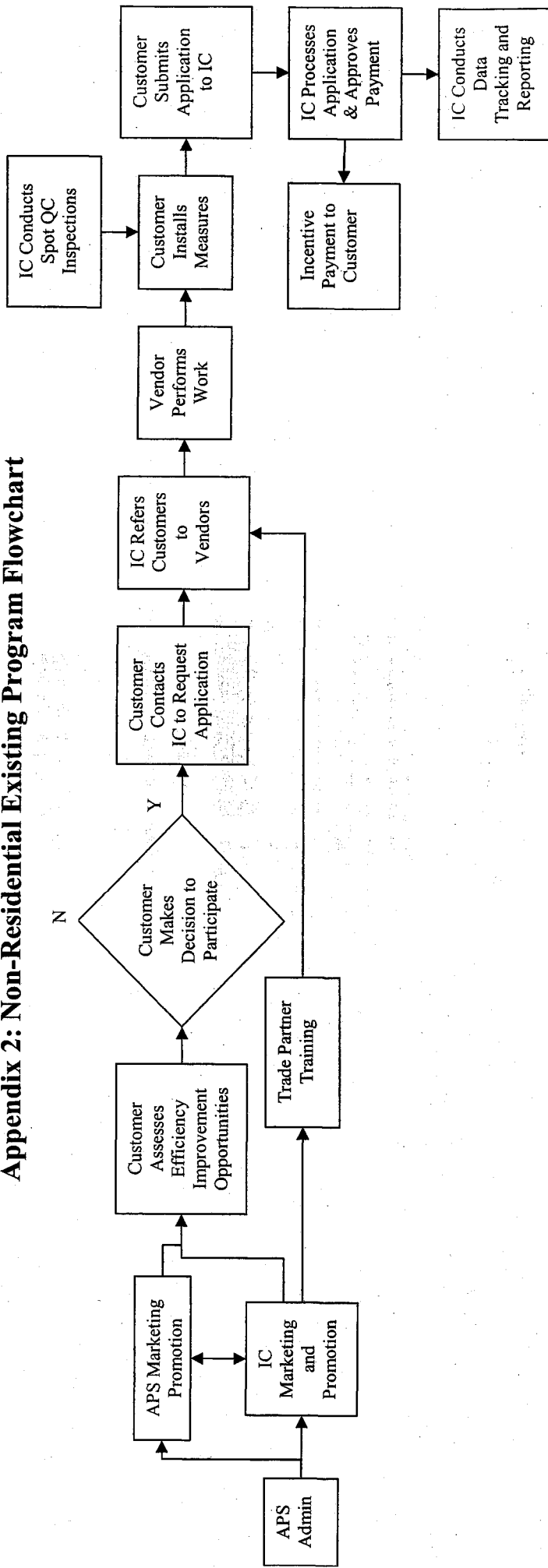
Refrigeration Measures		
Measure	Unit	Incentive/Unit
Strip Curtains on Walk-Ins	Linear Foot	\$5.00
Night Covers	Linear Foot	\$10.00
Anti-Sweat Heater Controls	Door	\$200.00
Reach in Cooler Controls	Reach in Cooler	\$100.00
High Efficiency Ice Makers*	Ice Maker	\$50.00
High Efficiency Reach-in Freezer**	Freezer	\$75.00
High Efficiency Reach-in Refrigerators**	Refrigerator	\$75.00
High Efficiency Evap Fan Motors		
PSC Motor	Motor	\$15.00
EC Motor	Motor	\$25.00
High Efficiency Vending Machines		
Beverage Case Controls	Vending Machine	\$100.00
Snack Machine Controls	Vending Machine	\$25.00

** Must meet the Federal Energy Management Program Recommended Efficiency levels of 110 lbs of ice per kWh.

** Must be Energy Star to Qualify.

Non-Residential DSM Program for Existing Facilities

Appendix 2: Non-Residential Existing Program Flowchart



Non-Residential DSM Program for Existing Facilities

Appendix 3 – Program Budget 2005-2007

See attached Budget spreadsheet

Appendix 3: Large Existing & Retrofit Non-Residential Program - Projected Budget 2005

	LG Existing Total	Planning & Administration	Program Marketing	Program Implementation	Rebates & Incentives	Training & Tech Assistance	Consumer Education
Lighting	\$ 910,229	\$ 91,023	\$ 86,472	\$ 273,069	\$ 409,603	\$ 31,858	18,205
HVAC	\$ 214,554	\$ 21,455	\$ 20,383	\$ 64,366	\$ 96,549	\$ 7,509	4,291
Refrigeration	\$ 101,588	\$ 10,159	\$ 9,651	\$ 30,476	\$ 45,715	\$ 3,556	2,032
Motors	\$ 372,523	\$ 37,252	\$ 35,390	\$ 111,757	\$ 167,635	\$ 13,038	7,450
Custom Efficiency Building Envelop	\$ 171,007	\$ 17,101	\$ 16,246	\$ 51,302	\$ 76,953	\$ 5,985	3,420
	\$ 60,953	\$ 6,095	\$ 5,791	\$ 18,286	\$ 27,429	\$ 2,133	1,219
Total Large Non-Res Existing	\$1,830,853	\$ 183,085	\$ 173,931	\$ 549,256	\$ 823,884	\$ 64,080	\$ 36,617
	100.0%	10.0%	9.5%	30.0%	45.0%	3.5%	2.0%

Note: Total DSM spending in 2005 is estimated to be \$13 million

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses

Program Marketing

Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education)

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives. If there is a DSM financing option, all costs related to this financing option will be supported through the DSM budget.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3: Large Existing & Retrofit Non-Residential Program - Projected Budget 2006

	LG Existing Total	Planning & Administration	Program Marketing	Program Implementation	Rebates & Incentives	Training & Tech Assistance	Consumer Education
Lighting	\$ 1,120,282	\$ 112,028	\$ 106,427	\$ 280,070	\$ 560,141	\$ 39,210	\$ 22,406
HVAC	\$ 264,066	\$ 26,407	\$ 25,086	\$ 66,017	\$ 132,033	\$ 9,242	\$ 5,281
Refrigeration	\$ 125,031	\$ 12,503	\$ 11,878	\$ 31,258	\$ 62,516	\$ 4,376	\$ 2,501
Motors	\$ 458,490	\$ 45,849	\$ 43,557	\$ 114,623	\$ 229,245	\$ 16,047	\$ 9,170
Custom Efficiency Building Envelop	\$ 210,470	\$ 21,047	\$ 19,995	\$ 52,617	\$ 105,235	\$ 7,366	\$ 4,209
	\$ 75,019	\$ 7,502	\$ 7,127	\$ 18,755	\$ 37,509	\$ 2,626	\$ 1,500
Total Large Non-Res Existing	\$ 2,253,358	\$ 225,336	\$ 214,069	\$ 563,340	\$ 1,126,679	\$ 78,868	\$ 45,067
	100.0%	10.0%	9.5%	25.0%	50.0%	3.5%	2.0%

Note: Total DSM spending in 2006 is estimated to be \$16 million

Budget Allocation

Planning and Administration	Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses
Program Marketing	Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).
Program Implementation	Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.
Rebates & Incentives	Includes all dollars that go toward customer rebates and incentives. If there is a DSM financing option, all costs related to this financing option will be supported through the DSM budget.
Training & Technical Assistance	Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.
Consumer Education	Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3: Large Existing & Retrofit Non-Residential Program - Projected Budget 2007

	LG Existing Total	Planning & Administration	Program Marketing	Program Implementation	Rebates & Incentives	Training & Tech Assistance	Consumer Education
Lighting	\$ 1,330,334	\$ 133,033	\$ 113,078	\$ 279,370	\$ 731,684	\$ 46,562	\$ 26,607
HVAC	\$ 313,579	\$ 31,358	\$ 26,654	\$ 65,852	\$ 172,468	\$ 10,975	\$ 6,272
Refrigeration	\$ 148,475	\$ 14,847	\$ 12,620	\$ 31,180	\$ 81,661	\$ 5,197	\$ 2,969
Motors	\$ 544,457	\$ 54,446	\$ 46,279	\$ 114,336	\$ 299,451	\$ 19,056	\$ 10,889
Custom Efficiency Building Envelop	\$ 249,933	\$ 24,993	\$ 21,244	\$ 52,486	\$ 137,463	\$ 8,748	\$ 4,999
	\$ 89,085	\$ 8,908	\$ 7,572	\$ 18,708	\$ 48,997	\$ 3,118	\$ 1,782
Total Large Non-Res Existing	\$ 2,675,863	\$ 267,586	\$ 227,448	\$ 561,931	\$ 1,471,724	\$ 93,655	\$ 53,517
	100.0%	10.0%	8.5%	21.0%	55.0%	3.5%	2.0%

Note: Total DSM spending in 2007 is estimated to be \$19 million

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses
Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Marketing

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives. If there is a DSM financing option, all costs related to this financing option will be supported through the DSM budget.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Non-Residential DSM Program for Existing Facilities

Appendix 4 – Estimated Energy Savings

See attached energy savings spreadsheet

Appendix 4: Large Existing Non-Residential - Energy Savings Calculations

Desired kW savings per unit	Peak Coincidence Factor	Annual Energy Savings kWh savings per unit	# unit 2005	# unit 2006	# unit 2007	TOTAL kW/05	TOTAL kW/06	TOTAL kW/07	TOTAL kW Savings 06-07	Meas. life	TOTAL Lifetime kWh/05	TOTAL Lifetime kWh/06	TOTAL Lifetime kWh/07	TOTAL Lifetime kWh savings	Total Program Cost 2005-2007 \$/kWh	Total Units 2005-2007	Notes	
Lighting Measures:																		
18 Fluorescents with Electronic Ballasts	0.031	136	10,240	14,004	18,292	265.2	403.7	527.4	126.3	18	26,087.701	34,280.817	44,770.056	104,127.374	42,538			
15 Systems	0.126	93%	1,271	1,738	2,271	148.0	203.7	268.1	618.7	18	13,564.098	18,135.583	23,607.771	55,274.869	15,538			
CFLs	0.076	93%	328	7,022	12,543	488.8	686.8	874.9	2,034.4	5	11,515.895	15,741.589	20,570.271	45,827.744	5,280			
Energy Efficient LED Exit Signs	0.036	100%	580	807	1,054	21.2	29.0	37.8	88.2	20	3,633.942	4,988.673	6,490.329	15,820.244	2,450			
Install - Daylighting Controls	0.045	93%	147	202	263	88.5	121.0	158.0	367.4	15	6,233.010	8,523.775	11,134.181	25,800.965	1,531			
Install - Occupancy Sensors	0.045	93%	481	369	504	659	15.1	20.8	28.9	62.7	12	2,127.005	2,903.819	3,800.852	8,838.577	1,531		
Dampening	0.086	93%	377	2,849	4,033	5,268	235.9	322.6	421.3	978.8	18	20,012.873	27,368.031	35,748.491	83,130.395	12,250		
Outdoor Lighting	0.082	35%	440	4,098	5,801	7,317	117.6	160.8	210.0	488.3	18	32,440.554	44,363.151	57,948.367	134,753.072	17,014		
HVAC Measures:																		
Air-cooled AC Units (packaged cooling)	2.031	95%	4,450	72	129	138.7	191.1	249.6	580.4	15	4,633.488	6,609.912	8,634.197	20,077.606	301		assumes 12.5 ton unit x 50 incentive per ton	
Install EE Air-cooled Chillers	24,000	70%	52,500	1	2	20.3	27.7	36.2	84.2	20	1,287.209	1,732.936	2,263.647	5,283.762	5		assumes 150 ton unit x 25 incentive per ton	
Install EE Water-cooled Chillers	50,000	70%	109,000	1	2	40.6	55.5	72.4	168.4	20	2,525.729	3,453.968	4,511.772	10,491.469	5		assumes 500 ton unit x 50 incentive per ton	
HVAC Diagnostics and Tune-up	1,225	95%	3,363	17	24	20.2	27.7	36.1	84.0	15	876.547	1,188.686	1,565.797	3,641.040	72		assumes 12.5 ton unit x 40 incentive per ton	
HVAC Quality Installation	1,650	95%	5,050	7	10	12.2	16.7	21.8	50.7	15	526.580	720.109	940.642	2,187.331	29		assumes 12.5 ton unit x 80 incentive per ton	
Refrigeration Measures:																		
High-efficiency Refrigerators	0.157	87%	826	165	225	22.5	30.7	40.2	93.4	15	2,090.055	2,766.451	3,642.414	8,469.920	684			
High-efficiency Freezers	0.183	87%	1,718	165	225	294	27.6	37.8	49.2	15	4,241.036	5,765.708	7,575.868	17,616.813	684			
High-efficiency Ice Makers	0.113	87%	592	41	69	7.3	4.0	5.5	7.2	15	282.281	366.700	522.109	1,214.080	171			
High-efficiency Evaporative Fan Motors	0.048	87%	324	94	128	167	3.9	5.3	7.0	15	454.445	621.463	811.786	1,887.684	388			
Reach-in Cooler Controls	0.114	87%	1,200	21	28	37	2.0	2.8	3.8	8.5	12	296.231	405.102	529.184	1,230.497	85		
Beverage Case Controls	0.153	87%	1,610	21	28	37	2.7	3.7	4.9	11.4	12	397.443	543.512	709.962	1,650.917	85		
Snack Machine Controls	0.031	87%	322	113	147	2.2	3.0	4.0	9.2	12	317.854	434.809	567.970	1,320.735	342			
Anti-sweat Heater Controls	0.667	87%	3,644	10	14	18	6.2	8.5	11.1	25.9	12	449.777	615.080	803.448	1,868.304	43		
Strip Curtains	0.029	87%	502	411	593	735	10.4	14.2	18.5	43.1	4	826.155	1,128.784	1,475.760	3,431.719	1,709		unit = per linear ft.
Night Covers	87%	404	206	281	367	0.0	0.0	0.0	0.0	4	332.437	454.614	593.840	1,380.891	855		unit = per linear ft.	
Motor Measures:																		
Energy Efficient ODP or TEFC Motors greater than 10 HP & less than 100 HP	0.095	95%	345	603	825	1,078	37.3	51.0	66.6	154.6	15	3,123.049	4,270.836	5,678.779	12,972.664	2,507		5-HP example at 5 incentive
greater than 10 HP & less than 100 HP	0.450	95%	2,500	211	289	317	80.3	123.5	161.3	375.1	15	7,920.776	10,831.830	14,148.078	32,901.684	877		50 HP example at 5 incentive
greater than 100 HP	1.050	95%	5,400	60	110	144	60.3	108.8	143.4	333.4	15	8,517.687	8,913.049	11,642.670	27,073.368	334		150 HP example at 5 incentive
Install - Variable Speed Drive	3.11	95%	132,650	9	12	16	28.7	36.6	47.8	111.1	15	19,011.844	24,631.562	32,175.004	74,818.430	38		50 HP example at 50 incentive
Building Envelop Measures:																		
Cool Roof Applications	10.82	95%	23,681	4	6	7	42.2	57.7	75.4	175.4	20	1,945.248	2,680.189	3,474.845	8,080.262	17		Assumes 12,000 s.f. avg. application
Custom Efficiency Program:																		
Custom Program	9.09	92%	227,273	3	4	5	25.7	35.2	46.0	108.9	20	13,981.443	19,133.597	24,893.262	58,116.920	13		Assumes average project at \$25K
Total LG Existing Non-Residential Program			28,909	39,534	51,841	2,029	2,775	3,625	8,430		184,802.081	252,720.795	330,116.538	767,639.414	\$	6,760,074	\$0.0098	120,085

• **Allegati**

where:
Column A = DSM measure

Column A = USM measure
Column B = kW savings

Column B = KVV savings
Column C = Peak coincident

Column C = Peak cooling

Column D = kWh savings

Columns E-G = APS estim

Columns H-K = total kW of

Attachment 7

Non-Residential New Construction and Major Renovation

Non-Residential New Construction & Major Renovation Program

Program Concept and Description

Design Assistance:

- Emphasize integrated design and influence equipment/systems selection and specification as early in the design development process as possible to improve the energy-efficiency of new non-residential construction projects and major renovations;
- Provide design incentives and/or design assistance to cover the incremental resources involved in assessing alternative design options that would improve the energy-efficiency of the project recognizing that time and budget constraints on the design team are a major market barrier to the design and construction of high efficiency buildings;
- Provide a subsidized consultation opportunity with the design team, which includes modeling of integrated design packages using building energy simulation models;
- Offer subsidized commissioning services, defined here as a systematic process to optimize a new building's operations and to ensure that the new building operates and performs as intended by the designer. Commissioning will be supported with documentation and training; and
- Provide two participation paths for implementation of enhanced design features: 1) prescriptive incentives for specific energy-efficiency measures, and 2) custom incentives based on performance and driven by energy savings for projects reaching beyond the standard, prescriptive measures.

Custom Efficiency Participation:

- Provide the opportunity to implement energy-efficiency measures not covered by prescriptive incentives for large non-residential customers;
- Encourage a systematic approach in addressing energy conservation measures;
- Provide for feasibility studies for more complex applications and a process for documenting proposed savings; and
- Explore and where appropriate consider emerging energy-efficiency technologies already being utilized commercially in the marketplace.

Common or Prescriptive Measures:

- Prescriptive incentives are provided for building owner/developers for energy-efficiency improvements in lighting, HVAC ("heating, ventilation, and air conditioning"), motor, and refrigeration applications.
- The program includes educational and promotional pieces designed to assist building owners/developers in making decisions to improve the energy-efficiency of the project facilities.
- Qualify and promote contractors that have gone through Commercial Qualified Contractor training and meet APS' standards for installation and operation of high efficiency systems.

Program Eligibility

- All new non-residential building projects with an estimated maximum monthly billed demand greater than 200 kW within the first year of operation.
- Major renovation projects of existing non-residential customers with a maximum monthly billed demand of greater than 200 kW in the past twelve months of billing history. In general, major renovation is defined as a major construction project or rebuilding of an existing facility that includes building envelop and energy-efficiency upgrades consistent with those found in new construction projects for which building energy codes would apply.

Target Market and Current Baseline Conditions

- It is anticipated that the market for new non-residential construction will be similar to the large existing non-residential APS customers (maximum monthly billed demand greater than 200 kW within the first year of operation). Types of customers that are this size include, but are not limited to:
 - Large Offices
 - Large Retail
 - Large Groceries
 - Resorts/Large Hotels
 - College/University
 - Inpatient Healthcare

Non-Residential New Construction & Major Renovation Program

- Lighting, HVAC, Refrigeration, and Other Miscellaneous Energy Loads comprise the energy loads used by these large customers. The following is a breakdown of the energy loads based on the 1996 APS End-Use Data Acquisition Project ("EUDAP"):

	<u>Lighting</u>	<u>HVAC</u>	<u>Refrigeration</u>	<u>Other</u>
Large Offices	28%	31%	nil	41%
Large Retail	44%	31%	nil	25%
Large Groceries	22%	15%	52%	11%
Resorts/Large Hotels	35%	51%	nil	14%
College/University	41%	46%	2%	11%
Inpatient Healthcare	38%	43%	nil	19%

APS has received approval, in ACC Decision No. 67816, to conduct an updated baseline study to obtain current end-use energy market knowledge and information for all segments. This updated information will replace the 1996 EUDAP information.

Other energy loads includes plug loads, water heating, process heating and cooling, cooking, and any other miscellaneous electric energy that a nonresidential customer may consume.

Program Rationale

- Increase the awareness and knowledge of facility and business owners and operators on the benefits of energy-efficiency.
- Provide decision making support to building owners/developers through the design assistance aspect of the program.
- Identify construction projects for new buildings or major renovations early in the design and/or development process in an effort to improve the energy-efficiency measures installed.
- Promote the installation of high-efficiency equipment and systems in new and major renovation construction projects.
- Promote the integrated system approach to new construction projects, and review opportunities to assess and install potential emerging energy-efficiency technologies being utilized commercially in the marketplace through the custom efficiency option.

Program Objectives

Design Assistance Measures:

- Promote integrated design and integrated analysis of alternative high-efficiency design packages.
- Assist the design team in examining alternative high-efficiency design packages through the provision of the design incentive.

Custom Efficiency Measures:

- Encourage facility-specific efficiency improvements through custom incentives that are otherwise difficult to cover in a prescriptive program.
- Encourage the integrated systems approach to incorporating energy-efficiency improvements in new construction and major renovation projects.

Common Measures:

- Promote integrated solutions where possible to capture interactive effects and synergistic savings opportunities
- Train commercial qualified contractors to meet APS' standards for installation and operation of high efficiency systems.

Products and Services Provided

- Educational and promotional efforts aimed at building owners/developers about the benefits of energy-efficiency improvements, improved systems performance and integrated design including educational brochures, program promotional material and website content.
- Two participation paths: 1) prescriptive incentives for specific energy-efficiency measures, and 2) custom or performance based incentives that are determined from estimated energy-efficiency savings.

Non-Residential New Construction & Major Renovation Program

- Commercial qualified contractor training to enhance system efficiency improvements;
- Prescriptive incentives are summarized in Appendix 1. Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.
- The maximum DSM incentive payout (for all prescriptive and custom incentives combined) is capped at \$300,000 total per customer per budget year in this program. However, if there are insufficient applications to use all of the available funds in this program in a given budget year, APS may choose to award additional funding to customers with qualifying proposals even if that additional funding exceeds their cap established in this program.

Custom Efficiency Measures:

- Incentives for building owners and managers to adopt custom energy-efficiency measures outside of the prescriptive efficiency list.
- The Custom incentive provided by the program is based on a one-time payout on the annual energy savings of the installed measure(s). This one-time payout is equal to \$0.11 per kWh saved.
- The maximum custom efficiency incentive payout is limited to 50% of the energy-efficiency related project costs, and shall not exceed the total customer incentive amount available in this program. The energy-efficiency related project costs are defined as the incremental costs associated with implementing the energy savings measures.
- Partial reimbursement of feasibility studies will be provided to participating customers to examine creative and innovative measures that might not be covered by prescriptive incentives. The incentive will cover up to 50% of the cost of the study with a maximum incentive limit of \$10,000 for the study. A feasibility study is defined as an energy simulation or energy study that identifies energy conservation measures and calculates the related annual energy savings as a result of installing these measures.
- For consideration to participate in APS' custom efficiency program applicants must provide an energy simulation that estimates the annual energy savings in support of the incentive amount requested for installing energy-efficient measures. This simulation must include:
 - Adequate documentation (list all assumptions and inputs),
 - Be easily interpreted by a third party reviewer,
 - Demonstrate annual energy savings (in kWh) over a standard design (e.g., American Society of Heating, Refrigerating, and Air-conditioning Engineers - ASHRAE standard 90.1).
 - The energy simulation may be part of Leadership in Energy & Environmental Design ("LEED") certification.
 - The simulation and its results will be reviewed and approved by APS or its IC to verify the savings validity and establish the incentive amount. Furthermore, APS reserves the right to determine the final energy savings estimate and associated incentive payout amount(s) in this DSM program.

Commissioning Incentives

- Incentives will be provided for commissioning studies, covering up to 50% of the cost of the study with a maximum incentive limit of \$10,000 for the study.
- The incentive provided for implementing the commissioning study recommendations is based on a one-time payout on the annual energy savings of the installed measure(s). This one-time payout is equal to \$0.11 per kWh saved.

Note: All incentives considered in this DSM program will be paid after completion of the project and verification that the energy-efficiency measure(s) were installed.

Delivery Strategy and Administration

- APS selects the implementation contractor ("IC");
- Implementation contractor provides program design, administration, marketing, vendor referrals, application and incentive processing, participation tracking and reporting, quality control, and technical support.
- APS/IC conduct commercial qualified contractor training program to provide a pool of trained and "Qualified" contractors and service technicians to deliver energy-efficiency products;
- See the program implementation flow charts included in Appendix 2.

Marketing and Communications

- APS/IC provides marketing including website content, media ads, etc.
 - IC conducts direct marketing to customers under the direction of APS, fielding of customer inquiries, and promotion of program products and services.
-

Non-Residential New Construction & Major Renovation Program

Program Implementation Schedule

- The following table shows the estimated timeline for key program activities by quarter:

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Collaborative Meetings & Program Buy-in																											
Program Pre-approval Filed with ACC																											
Issue RFP for IC Contractor																											
Program Approval by ACC																											
Review and Select IC Contractor																											
Begin Program Implementation and Promotion to Contractors, Trade Allies & Customers																											
Continuous Program Implementation																											
Process Evaluation (on going)																											
Program Redesign (as needed)																											
Savings Verification																											

* Selection of the IC, as a result of the RFP process, will be completed after ACC approval of the program, and the timeline will be adjusted accordingly.

Monitoring and Evaluation Plan

- The strategy for monitoring and evaluation will involve integrated evaluation. In this approach, data are collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data at a lower cost.
- The evaluation strategy for this program will include detailed and systematic documentation of design features, and field verification of measured installations.

Program Budget

- The following is the Non-Residential DSM program budget for Large New Construction & Major Renovation customers, which includes planning & administration, implementation, incentives, consumer education, training & technical assistance, and marketing:
 - 2005: \$2.0 million
 - 2006: \$2.5 million
 - 2007: \$2.9 million
- See Appendix 3 for more information about the program budget.

Estimated Energy Savings

The total program cost per lifetime kWh is \$0.0100, which equals \$7,360,074 total program costs / 735,071,600 lifetime kWh.

The following Table shows the estimated energy savings for the program:

	2005	2006	2007	Program Total 2005-2007
Estimated Energy Savings (kWh)	1,646	2,251	2,940	6,837
Estimated Program Cost (\$)	176,961,700	241,998,900	316,111,000	735,071,600

- See Appendix 4 for more detailed information on savings estimates.

Non-Residential New Construction & Major Renovation Program

Program Cost Effectiveness

The Large New Construction & Major Renovation Non-Residential DSM program is effective with a Societal Cost Test benefit/cost ratio of 2.54.

Program Cost	Program Cost	Program Cost	Program Cost	Societal Cost Test Benefit/Cost Ratio
\$7,360,074	\$0.0100	\$26,725,755	\$10,505,604	2.54

In addition to the savings shown above, it is estimated that the program will produce these environmental benefits over the life of the measures:

Water Savings*	179,671,678 gal.
SOx	3,161 lbs.
NOx	126,432 lbs.
CO2	674,060,640 lbs.
PM10	17,421 lbs.

* Total water savings including both utility and customer savings.

Non-Residential New Construction & Major Renovation Program

Appendix 1 – Incentive levels by Measure

See accompanying Excel spreadsheet for incentive levels

Prescriptive Lighting Incentive Worksheet

2005

Equipment Type	Incentive
Premium T8 Electronic Ballast Fixtures	
2-foot to 4-foot lamp	\$1.50 per lamp
8-foot lamp	\$2.50 per lamp

T5 Electronic Ballast	
1 Lamp T5 (2' - 4')	\$3.00 per fixture
2 Lamp T5 (2' - 4')	\$7.00 per fixture
4 Lamp T5 HO F28	\$75.00 per fixture

Outdoor Lighting	
CFL \leq 26 W	\$2.50 per fixture
CFL $>$ 26 W \leq 55 W	\$3.50 per fixture
CFL $>$ 55 W	\$5.00 per fixture
High Pressure Sodium	\$10.00 per fixture

Equipment Type	Incentive
Compact Fluorescent Lamps (CFL)	
All sizes	\$1.75 per lamp

Exit Signs (LED or Electroluminescent)	
Double or Single Face	\$25.00 per unit

Occupancy Sensors	
All Sensor Mountings	\$40.00 per sensor
Daylighting Controls	\$100.00 per unit

Prescriptive Cooling Incentive Worksheet

2005

Equipment Type	Size Category	Qualifying Efficiency	Incentive	Efficiency Incentive
Air Cooled AC Units (Split System and Single Package Units)	≤ 5 Tons	11.6 EER	\$50.00	per ton
	> 5 Tons	11.4 EER	\$50.00	per ton
	≤ 10 Tons	11.2 EER	\$25.00	per ton
Water Cooled Chillers	> 10 Tons	11.2 EER	\$25.00	per ton
	All Sizes	.61 kW/Ton	\$10.00	per kW/Ton under .61 per ton
Air Cooled Chillers	< 150 Tons	1.25 kW/Ton	\$10.00	per kW/Ton under 1.25 per ton
	≥ 150 Tons	1.25 kW/Ton	\$15.00	per kW/Ton under 1.25 per ton

Quality Installation	≤ 10 Tons	NA	\$125.00	per ton	Size Category = Total Project Capacity
	> 10 Tons ≤ 25 Tons	NA	\$100.00	per ton	Size Category = Total Project Capacity
	> 25 Tons	NA	\$75.00	per ton	Size Category = Total Project Capacity
Programmable Thermostats	NA	NA	\$50.00	per T Stat	
Cool Roofs	NA	NA	\$0.50	per Sq Ft	Both roof coatings and single membrane

Prescriptive Motor Incentive Worksheet

2005

Premium Efficiency Motors									
Horse Power	3600 RPM		1800 RPM		1200 RPM		Incentive/HP		
	Open	Closed	Open	Closed	Open	Closed		Open	Closed
1	77.6%	77.6%	85.7%	85.0%	82.2%	82.7%	\$5		
1.5	85.4%	85.1%	86.9%	87.2%	86.2%	87.3%	\$5		
2	86.7%	86.1%	87.5%	87.4%	87.1%	88.1%	\$5		
3	86.1%	87.6%	89.8%	89.7%	89.3%	89.0%	\$5		
5	88.5%	89.5%	90.4%	90.2%	90.1%	90.0%	\$5		
7.5	89.7%	90.5%	91.7%	91.5%	91.5%	91.4%	\$5		
10	90.4%	91.7%	92.0%	91.8%	92.0%	91.7%	\$5		
15	91.0%	91.8%	93.2%	92.7%	92.7%	92.5%	\$5		
20	91.8%	92.1%	93.3%	93.3%	92.9%	92.5%	\$5		
25	92.9%	92.9%	94.0%	93.8%	93.7%	93.4%	\$5		
30	93.3%	92.7%	94.0%	93.9%	94.0%	93.7%	\$5		
40	93.6%	93.4%	94.5%	94.6%	94.5%	94.3%	\$5		
50	93.7%	93.9%	94.9%	94.9%	94.6%	94.4%	\$5		
60	94.3%	94.3%	95.6%	95.2%	95.1%	94.9%	\$5		
75	94.4%	94.5%	95.3%	95.4%	95.3%	94.9%	\$5		
100	94.6%	94.8%	95.9%	95.5%	95.5%	95.1%	\$5		
125	94.7%	95.2%	95.9%	95.4%	95.7%	95.1%	\$5		
150	94.8%	95.5%	96.1%	95.8%	95.9%	95.9%	\$5		
> 150	95.1%	95.7%	96.2%	96.3%	96.0%	95.8%	\$5		

Efficiency standards are for all motors less than or equal to the indicated horsepower (up to the lower sized motor).

For example, for a 4 HP motor, use the efficiency standard for a 5 HP motor.

Variable Speed Drives		
Horse Power	Incentive per HP	
All Sizes	\$	50.00

Prescriptive Refrigeration Incentive Worksheet

2005

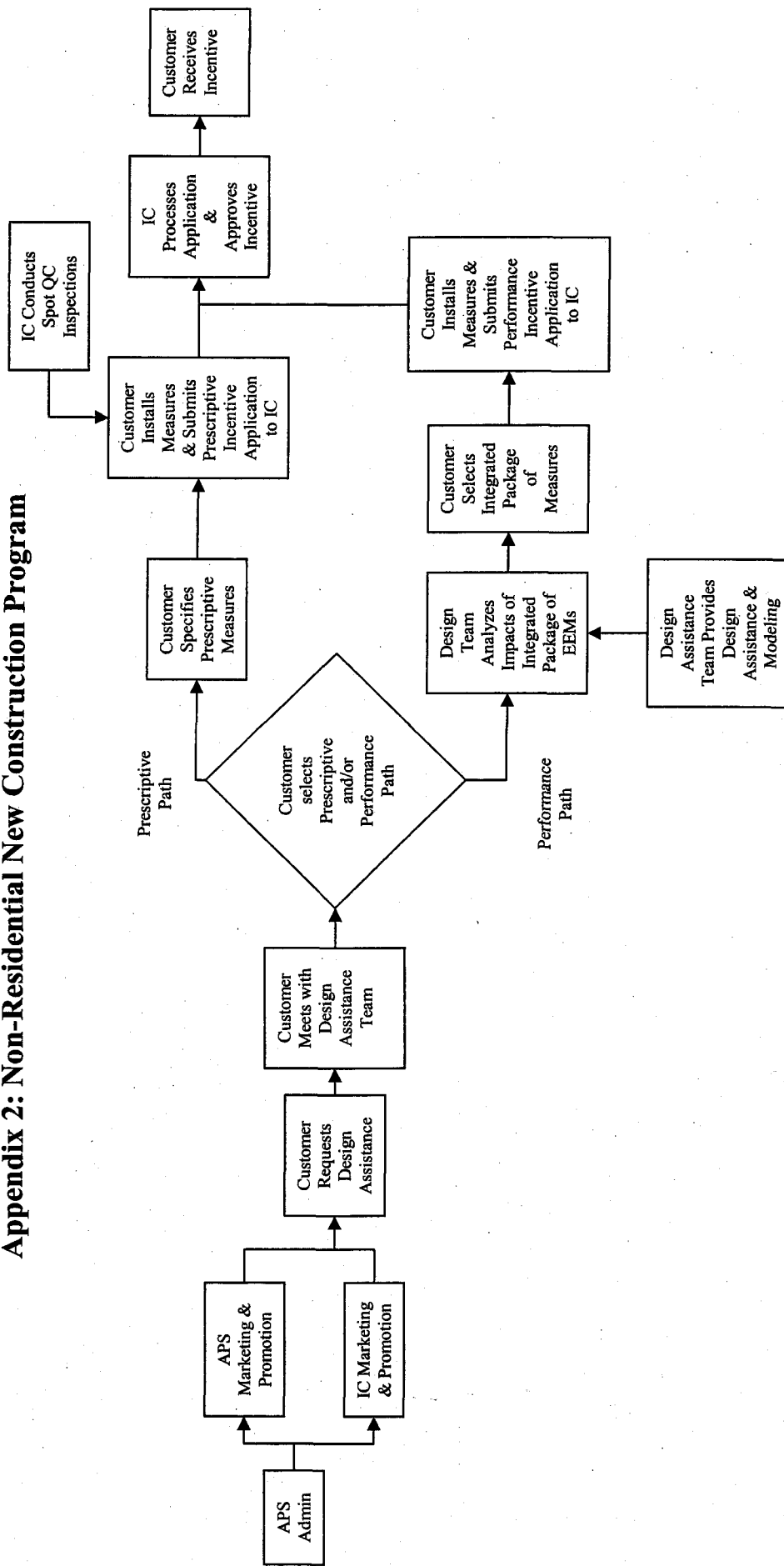
Refrigeration Measures		
Measure	Unit	Incentive/Unit
Strip Curtains on Walk-Ins	Linear Foot	\$5.00
Night Covers	Linear Foot	\$10.00
Anti-Sweat Heater Controls	Door	\$200.00
Reach in Cooler Controls	Reach in Cooler	\$100.00
High Efficiency Ice Makers*		
High Efficiency Reach-in Freezer**	Ice Maker	\$50.00
High Efficiency Reach-in Refrigerators**	Freezer	\$75.00
	Refrigerator	\$75.00
High Efficiency Evap Fan Motors		
PSC Motor	Motor	\$15.00
EC Motor	Motor	\$25.00
High Efficiency Vending Machines		
Beverage Case Controls	Vending Machine	\$100.00
Snack Machine Controls	Vending Machine	\$25.00

** Must meet the Federal Energy Management Program Recommended Efficiency levels of 110 lbs of ice per kWh.

** Must be Energy Star to Qualify.

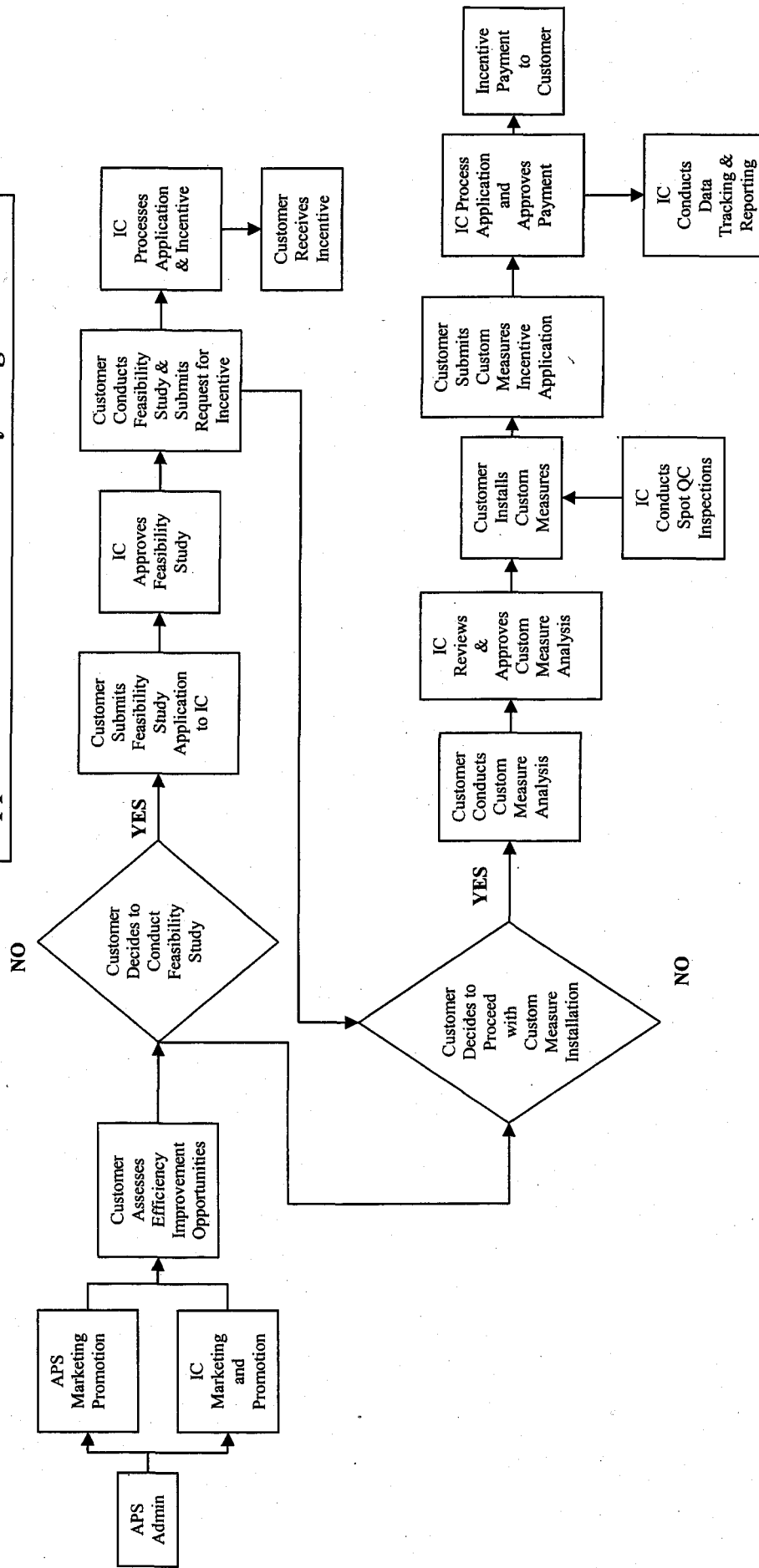
Non-Residential New Construction & Major Renovation Program

Appendix 2: Non-Residential New Construction Program



Non-Residential New Construction & Major Renovation Program

Appendix 2: Custom Efficiency Program



Appendix 3 – Program Budget 2005-2007

See attached Budget spreadsheet

Appendix 3: Large New Construction Non-Residential Program - Projected Budget 2005

	LG NEW	Planning & Administration	Program Marketing	Program Implementation	Rebates & Incentives	Training & Tech Assistance	Consumer Education
Lighting	Total	\$ 49,834	\$ 47,342	\$ 149,502	\$ 224,252	\$ 17,442	\$ 9,967
HVAC	\$ 199,335	\$ 19,934	\$ 18,937	\$ 59,801	\$ 89,701	\$ 6,977	\$ 3,987
Refrigeration	\$ 99,668	\$ 9,967	\$ 9,468	\$ 29,900	\$ 44,850	\$ 3,488	\$ 1,993
Motors	\$ 398,671	\$ 39,867	\$ 37,874	\$ 119,601	\$ 179,402	\$ 13,953	\$ 7,973
Custom Efficiency	\$ 598,006	\$ 59,801	\$ 56,811	\$ 179,402	\$ 269,103	\$ 20,930	\$ 11,960
Design Efficiency	\$ 199,335	\$ 19,934	\$ 18,937	\$ 59,801	\$ 89,701	\$ 6,977	\$ 3,987
Total Large Non-Res New Const	\$1,993,353	\$ 199,335	\$ 189,369	\$ 598,006	\$ 897,009	\$ 69,767	\$ 39,867
	100.0%	10.0%	9.5%	30.0%	45.0%	3.5%	2.0%

Note: Total DSM spending in 2005 is estimated to be \$13 million

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses
Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Marketing

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3: Large New Construction Non-Residential Program - Projected Budget 2006

	LG NEW	Planning & Administration	Program Marketing	Program Implementation	Rebates & Incentives	Training & Tech Assistance	Consumer Education
	Total						
Lighting	\$ 613,340	\$ 61,334	\$ 58,267	\$ 153,335	\$ 306,670	\$ 21,467	\$ 12,267
HVAC	\$ 245,336	\$ 24,534	\$ 23,307	\$ 61,334	\$ 122,668	\$ 8,587	\$ 4,907
Refrigeration	\$ 122,668	\$ 12,267	\$ 11,653	\$ 30,667	\$ 61,334	\$ 4,293	\$ 2,453
Motors	\$ 490,672	\$ 49,067	\$ 46,614	\$ 122,668	\$ 245,336	\$ 17,174	\$ 9,813
Custom Efficiency	\$ 736,007	\$ 73,601	\$ 69,921	\$ 184,002	\$ 368,004	\$ 25,760	\$ 14,720
Design Efficiency	\$ 245,336	\$ 24,534	\$ 23,307	\$ 61,334	\$ 122,668	\$ 8,587	\$ 4,907
Total Large Non-Res New Const	\$ 2,453,358	\$ 245,336	\$ 233,069	\$ 613,340	\$ 1,226,679	\$ 85,868	\$ 49,067
	100.0%	10.0%	9.5%	25.0%	50.0%	3.5%	2.0%

Note: Total DSM spending in 2006 is estimated to be \$16 million

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses

Program Marketing

Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3: Large New Construction Non-Residential Program - Projected Budget 2007

	LG NEW	Planning & Administration	Program Marketing	Program Implementation	Rebates & Incentives	Training & Tech Assistance	Consumer Education
Lighting	Total						
HVAC	\$ 728,341	\$ 72,834	\$ 61,909	\$ 152,952	\$ 400,587	\$ 25,492	\$ 14,567
Refrigeration	\$ 291,336	\$ 29,134	\$ 24,764	\$ 61,181	\$ 160,235	\$ 10,197	\$ 5,827
Motors	\$ 145,668	\$ 14,567	\$ 12,382	\$ 30,590	\$ 80,117	\$ 5,098	\$ 2,913
Custom Efficiency	\$ 582,673	\$ 58,267	\$ 49,527	\$ 122,361	\$ 320,470	\$ 20,394	\$ 11,653
Design Efficiency	\$ 874,009	\$ 87,401	\$ 74,291	\$ 183,542	\$ 480,705	\$ 30,590	\$ 17,480
Total Large Non-Res New Const	\$ 2,913,363	\$ 291,336	\$ 247,636	\$ 611,806	\$ 1,602,349	\$ 101,968	\$ 58,267
	100.0%	10.0%	8.5%	21.0%	55.0%	3.5%	2.0%

Note: Total DSM spending in 2007 is estimated to be \$19 million

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses

Program Marketing

Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 4 – Estimated Energy Savings
See attached energy savings spreadsheet

Appendix 4: Large New Construction Non-Residential - Energy Savings Calculations

Lighting Measures:	Demand kW Peak savings per unit	Coincidence Factor	Annual Energy Savings kWh savings per unit	# units										TOTAL kW Savings 06-07	TOTAL Lifetime kWh 06	TOTAL Lifetime kWh 07	TOTAL Lifetime kWh savings 06-07	Total Units 2005-2007	Notes
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014						
Premium T8 Systems	0.012	95%	61	27,751	37,950	49,573	39,977	42,515	653.2	1296.5	16	30,470,588	1,660,519	54,430,809	126,571,164	115,274			
T5 Systems	0.128	93%	550	928	1,269	1,658	1,087	1,487	194.2	461.7	16	8,186,610	466,510	12,962,965	16,410,368	3,855			
CFLs	0.075	93%	328	3,844	5,257	6,867	268.1	366.7	470.0	113.8	5	1,984,962	8,621,901	11,262,228	26,188,720	15,969			
Energy Efficient LED Exit Signs	0.038	100%	308	323	442	577	11.6	15.9	22.8	48.3	20	2,726,283	3,553,370	6,085,818	14,174,964	1,341			
Install - Daylighting Controls	0.045	93%	2,816	81	110	144	48.4	66.2	86.5	201.2	15	3,412,691	1,589,066	2,004,971	4,859,065	335			
Install - Occupancy Sensors	0.044	93%	481	202	276	361	8.3	11.3	14.8	34.3	12	1,184,348	1,589,066	2,004,971	4,859,065	335			
Delamping	0.086	93%	377	202	276	361	8.3	11.3	14.8	34.3	12	1,184,348	1,589,066	2,004,971	4,859,065	335			
Outdoor Lighting	0.082	35%	440	-	-	2,208	129.1	176.6	230.7	536.4	18	10,958,798	14,983,839	19,572,376	45,512,902	6,707			
HVAC Measures:																			
Air-cooled AC Units (packaged cooling)	2.031	95%	4,450	67	92	120	129.8	177.5	231.9	539.3	15	4,480,651	6,141,062	8,021,762	18,653,075	279	assumes 12.5 ton unit x 50 incentive per ton		
Install EE Air-cooled Chillers	24,000	70%	52,500	1	2	2	16.6	25.8	33.6	78.2	20	1,177,324	1,610,016	2,103,084	4,890,024	671	assumes 150 ton unit x 25 incentive per ton		
Install EE Water-cooled Chillers	50,000	70%	109,000	1	1	1	37.7	51.5	67.3	156.5	20	2,346,576	3,208,962	4,191,746	9,747,714	671	assumes 500 ton unit x 50 incentive per ton		
HVAC Diagnostics and Tune-up	1,225	95%	3,363	16	22	28	11.4	15.3	20.3	47.1	15	814,372	1,113,671	1,454,733	3,362,776	168	assumes 12.5 ton unit x 40 incentive per ton		
HVAC Quality Installation	1,850	95%	5,050	6	9	12	11.4	15.3	20.3	47.1	15	489,229	689,031	873,921	2,032,181	381	assumes 12.5 ton unit x 80 incentive per ton		
Refrigeration Measures:																			
High-efficiency Refrigerators	0.157	87%	628	161	221	288	22.1	30.2	39.4	91.6	15	2,000,510	2,736,740	3,573,560	8,309,809	671			
High-efficiency Freezers	0.193	87%	1,718	161	221	288	27.1	37.1	48.4	112.5	15	4,160,668	5,690,073	7,432,658	17,263,597	671			
High-efficiency Ice Makers	0.113	87%	592	40	55	72	4.0	5.4	7.1	16.5	12	286,756	392,145	512,238	1,191,140	168			
High-efficiency Evaporative Fan Motors	0.048	87%	324	92	125	164	3.8	5.2	6.8	15.9	15	445,854	603,715	786,441	1,852,010	381			
Reach-in Cooler Controls	0.114	87%	1,200	20	28	36	2.0	2.7	3.6	8.3	12	290,631	397,444	519,161	1,207,236	84			
Beverage Case Controls	0.153	87%	1,610	20	28	36	2.7	3.7	4.8	11.2	12	389,830	533,237	695,941	1,619,708	84			
Snack Machine Controls	0.031	87%	322	10	14	18	2.2	3.0	3.9	9.0	12	311,944	426,600	557,253	1,265,787	84			
Anti-sweat Heater Controls	0.097	87%	3,844	10	14	18	6.1	8.4	10.9	25.4	12	441,275	603,452	786,260	1,832,987	335			
Strip Curtains	0.029	87%	502	404	552	721	10.2	13.9	18.2	42.3	4	810,537	1,108,427	1,447,883	3,368,847	42			
Night Covers	-	87%	404	202	276	361	0.0	0.0	0.0	0.0	4	326,152	446,020	582,814	1,354,707	1,677	unit = per linear ft.		
Motor Measures:																			
Energy Efficient ODP or TEFC Motors less than 10 HP	0.065	95%	345	646	883	1,154	39.9	54.5	71.2	165.7	15	3,342,256	4,570,008	5,970,354	13,883,216	2,683	5 HP example at 5 incentive		
greater than 10 HP & less than 100 HP	0.450	95%	2,500	226	309	404	96.8	132.2	172.6	401.4	15	8,676,735	11,592,117	15,142,202	35,211,054	2,683	50 HP example at 5 incentive		
greater than 100 HP	1.050	95%	5,400	86	118	154	85.9	117.5	153.4	356.8	15	6,975,142	9,539,656	12,459,969	28,973,667	358	150 HP example at 5 incentive		
Install - Variable Speed Drive	3.11	95%	132,650	10	13	17	28.6	39.1	51.1	118.9	15	18,276,086	26,340,473	34,433,368	80,068,937	40	50 HP example at 50 incentive		
Building Envelop Measures:																			
Cool Roof Applications	10.82	95%	23,681	-	-	-	0.0	0.0	0.0	0.0	20	0	0	0	0	-	Assumes 12,000 s.f. avg. application		
Custom Efficiency Program:																			
Custom Program	9.09	92%	227,273	11	15	19	90.0	123.1	160.8	373.9	20	48,527,765	66,909,764	87,400,879	203,238,407	45	Assumes average project at \$25K		
Design Assistance Program:																			
Design Assistance	13.6	92%	38,725	10	14	18	124.3	170.0	222.1	516.4	20	7,696,509	10,523,774	13,746,679	31,965,962	41	Assumes average project at \$8,125		
Total LG New Const Non-Residential Program																			
				37,016	50,620	66,122	1,646	2,251	2,940	6,837	176,951,677	241,998,875	316,111,030	735,071,581	\$	7,360,074	\$0.9100	153,716	

Where:
 Column A = DSM measure
 Column B = kW savings
 Column C = Peak coincidence - APS and Summit Blue Consulting analysis
 Column D = kWh savings/unit
 Column E-G = APS estimates of # units each year. All estimates will be updated with results from the APS market potential study.
 Column H-K = total kW demand savings estimate
 Column L = Measure life for each end use technology
 Column M-P = Estimated lifetime kWh energy savings over the expected life of the measures.

Attachment 8

Small Non-Residential

Small Non-Residential DSM Program

Program Concept and Description

- Provide prescriptive incentives for small non-residential customers for energy-efficiency improvements in lighting, HVAC ("heating, ventilation, and air conditioning"), motors, and refrigeration applications through a simple and straightforward mechanism for program participation:
 - Train contractors on installation and operation of high efficiency systems through a commercial qualified contractor training program;
 - Qualify and promote contractors that have gone through commercial qualified contractor training and meet APS' standards for installation and operation of high efficiency systems;
 - Provide a "one source" audit and installation resource for small non-residential customers through the commercial qualified contractor network to make the process as simple and trouble-free for the consumer as possible;
 - Promote a "systems approach" to improving the efficiency of small commercial HVAC systems. This will be accomplished by promoting proper sizing of new packaged air conditioning equipment, staged air conditioning equipment, and systems diagnostics and improvements that include air balancing, proper refrigerant charging, and duct leakage sealing; and
- Provide educational and promotional materials designed to assist building owners and operators in making decisions to improve the energy-efficiency of their facilities.

Target Market and Current Baseline Conditions

- Small to mid-sized non-residential APS customers with a maximum monthly billed demand of less than or equal to 200 kW in the past twelve months of billing history.
- Types of customers that are typically this size include, but are not limited to:
 - Quick Service Restaurants
 - Sit-Down Restaurants
 - Primary Schools
 - Secondary Schools
 - Small Offices
 - Small Retail
 - Small Groceries
 - Hotels
 - Outpatient Healthcare
- Lighting, HVAC, Refrigeration, and Other Miscellaneous Electric Loads comprise the energy loads used by these customers. The following is a breakdown of the energy loads based on the 1996 APS End-Use Data Acquisition Project ("EUDAP"):

	<u>Lighting</u>	<u>HVAC</u>	<u>Refrigeration</u>	<u>Other</u>
Quick Service Restaurants	21%	37%	16%	26%
Sit Down Restaurants	21%	31%	13%	35%
Primary Schools	41%	36%	<1%	23%
Secondary Schools	33%	37%	<1%	29%
Small Offices	42%	41%	nil	17%
Small Retail	54%	26%	nil	20%
Small Groceries	21%	34%	29%	16%
Small Hotels	35%	51%	nil	14%
Outpatient Healthcare	35%	52%	nil	13%

APS has received approval, in ACC Decision No. 67816, to conduct an updated baseline study to obtain current end-use energy market knowledge and information for all segments. This updated information will replace the 1996 EUDAP information.

Other energy loads includes plug loads, water heating, process heating and cooling, cooking, and any other miscellaneous electric energy that a non-residential customer may consume.

Program Eligibility

- New or existing non-residential customers with a maximum monthly billed demand of less than or equal to 200 kW in the past twelve months of billing history.

Small Non-Residential DSM Program

Program Rationale

- Increase the energy-efficiency of the customers' facilities within the small customer segment.
- Increase the awareness and knowledge of the commercial building ownership and management community on the benefits of efficiency measures and assure that the participation process is clear, easy to understand and simple.

Program Objectives

- Provide Demand Side Management opportunities for small non-residential customers:
 - Promote the installation of high-efficiency lighting, packaged HVAC equipment, motors, and refrigeration systems;
 - Increase the availability of trained and qualified contractors and service technicians who are knowledgeable about systems performance issues, proper diagnostic, operation and commissioning techniques, and the importance of energy and comfort conditioning benefits of systems that are properly installed and operated;
 - Provide an integrated "one-stop shopping" approach to energy upgrades;
 - Explore and where appropriate consider emerging energy-efficiency technologies already being utilized commercially in the marketplace; and
 - Promote cross-training and energy-efficiency identification and referral opportunities among HVAC and lighting contractors.

Products and Services Provided

- Create a Commercial Qualified Contractor Program to train and refer qualified contractors who meet APS' minimum business qualifications and training on HVAC energy-efficiency measures, and performance testing and diagnostics. APS staff will work with contractors to enable them to provide whole facility integrated energy-efficiency solutions including the following:
 - The systems approach to HVAC, including the energy and comfort benefits of properly installed and operated HVAC systems;
 - State-of-the-art field testing and diagnostic techniques; and
 - Energy-efficiency and performance impacts of performance factors such as refrigerant charge, air flow over the coil, air distribution and duct leakage;
- Educational and promotional efforts aimed towards building owners and operators about the benefits of energy-efficiency improvements and improved systems performance, including educational brochures, program promotional material and website content ;
- The possibility of including 3rd-party (not APS or Pinnacle West) financing will be explored as a potential future offering in this program. Some small business customers lack capital to invest in energy-efficiency improvements, or choose to invest this capital in business-related purchases over energy-efficiency upgrades. All costs associated with this financing option will be from DSM funds.
- Provide incentives for building owners and managers to adopt the measures recommended by the program.
- The prescriptive measures offered are for energy-efficient lighting, HVAC, motors and refrigeration on a first come first served basis. See Appendix 1 for incentive amounts by end-use measure. Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.
 - Incentive levels will be reviewed annually and adjusted as appropriate.
 - The maximum DSM incentive payout is capped at \$150,000 total per customer per budget year in this program. However, if there are insufficient applications to use all of the available funds in this program in a given budget year, APS may choose to award additional funding to customers with qualifying proposals even if that additional funding exceeds their cap established in this program.

Note: All incentives considered in this DSM program will be paid after completion of the project and verification that the energy-efficiency measure(s) were installed.

Delivery Strategy and Administration

- APS selects Implementation Contractor ("IC");
- Implementation contractor provides program design, administration, marketing, vendor referrals, application and incentive processing, coordination of education and training program, participation tracking and reporting, quality control, and technical support;

Small Non-Residential DSM Program

- APS/IC conduct Commercial Qualified Contractor training program to provide a pool of trained and "Qualified" contractors and service technicians to deliver energy-efficiency products;
 - APS/IC/Qualified Contractors recruit small non-residential customers to participate;
 - Electric League serves as a conduit by providing referrals to Commercial Qualified Contractors;
 - Qualified contractors provide diagnostics, sales and installation services for energy-efficiency measures;
 - IC/Qualified Contractors determine participants' efficiency opportunities, educate participants, and deliver prescribed energy-efficiency measures.
- A program implementation flow chart is included in Appendix 2.

Marketing and Communications

- APS/IC provides marketing and branding including bill stuffers, website content, media ads, etc.
- IC conducts direct marketing to customers under the direction of APS, fielding of customer inquiries, promotion of program products and services, and promotion of Qualified Contractors.

Program Implementation Schedule

- The following table shows the estimated timeline for key program activities by quarter.

Program Activity	Timeline											
	2005			2006			2007					
Collaborative Meetings & Program Buy-in												
Program Pre-approval Filed with ACC												
Issue RFP for IC Contractor												
Program Approval by ACC												
Review and Select IC Contractor												
Begin Program Implementation and Promotion to Contractors, Trade Allies & Customers												
Continuous Program Implementation												
Process Evaluation (on going)												
Program Redesign (as needed)												
Savings Verification												

* Selection of the IC, as a result of the RFP process, will be completed after ACC approval of the program, and the timeline will be adjusted accordingly.

Monitoring and Evaluation Plan

- The strategy for monitoring and evaluation will involve integrated evaluation. In this approach, data are collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data at a lower cost.
- Field verification (where applicable) will be vendor driven and reported.

Program Budget

- The following is the Small Non-Residential program budget, which includes planning & administration, implementation, incentives, consumer education, training & technical assistance, and marketing:
 - 2005: \$1.2 million
 - 2006: \$1.5 million
 - 2007: \$1.7 million
- See Appendix 3 for more information about the program budget.

Estimated Energy Savings

The Small Non-Residential total program cost per lifetime kWh is \$0.0081, which equals \$4.4 million total program costs / 539,983,200 lifetime kWh. See Appendix 4 for more detailed information on savings estimates.

Small Non-Residential DSM Program

The following Table shows the estimated energy savings for the program:

Year	Annual Peak kW Demand Savings	Lifetime kWh Savings*
2005	1,512	129,996,000
2006	2,068	177,772,200
2007	2,701	232,215,000
Program Total 2005-2007	6,281	539,983,200

* Lifetime kWh savings refers to total energy savings over the expected life of the DSM measure.

Program Cost Effectiveness

The Small Non-Residential DSM program is effective with a weighted average Societal Cost Test benefit/cost ratio of 3.08.

Total APS Program Cost 2005-2007	\$/Lifetime kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$4,359,852	\$0.0081	\$15,914,298	\$5,159,253	3.08

In addition to the savings shown above, it is estimated that the program will produce these environmental benefits over the life of the measures:

Water Savings*	132,516,054 gal.
SOx	2,322 lbs.
NOx	92,877 lbs.
CO2	495,164,468 lbs.
PM10	12,798 lbs.

* Total water savings includes both utility and customer savings.

Small Non-Residential DSM Program

Appendix 1 – Incentive levels by Measure

See accompanying Excel spreadsheet for incentive levels

Prescriptive Lighting Incentive Worksheet

2005

Standard T8 or T5 Electronic Ballast Fixtures			
2-foot to 4-foot lamp	T12 magnetic ballast	\$ 5.00	per lamp
8-foot lamp	T12 magnetic ballast	\$ 8.00	per lamp

Delamping			
3 Lamp T8	4 Lamp T12	\$7.00	per fixture
2 Lamp T8 or T5	4 Lamp T12	\$13.00	per fixture
2 Lamp T8 or T5	3 Lamp T12	\$7.00	per fixture
1 Lamp T8 or T5	2 Lamp T12	\$7.00	per fixture
3 Lamp T8 or T5	4 Lamp T8	\$3.00	per fixture
2 Lamp T8 or T5	4 Lamp T8	\$7.00	per fixture
2 Lamp T8 or T5	3 Lamp T8	\$3.00	per fixture
1 Lamp T8 or T5	2 Lamp T8	\$3.00	per fixture

Compact Fluorescent Lamps (CFL)		
All sizes	Incandescent	\$1.75 per lamp

Exit Signs (LED or Electroluminescent)		
Double or Single Face	Incandescent or CFL	\$25.00 per unit

Occupancy Sensors & Daylighting Controls		
All Sensor Mountings		\$40.00 per sensor
Daylighting Controls		\$100.00 per unit

Premium T8 Electronic Ballast Fixtures			
2-foot to 4-foot lamp	T12 magnetic ballast	\$8.00	per lamp
8-foot lamp	T12 magnetic ballast	\$10.00	per lamp

T5 F28 HO Electronic Ballast		
4 Lamp T5	Metal Halide	\$75.00 per fixture

Outdoor Lighting			
CFL < 26 W	Incandescent	\$2.50	per fixture
CFL > 26 W < 55 W	Incandescent	\$3.50	per fixture
CFL > 55 W	Incandescent	\$5.00	per fixture
CFL Flood	Halogen PAR	\$3.50	per fixture
High Pressure Sodium	Halogen PAR	\$25.00	per fixture
High Pressure Sodium	Mercury Vapor	\$10.00	per fixture
High Pressure Sodium	Metal Halide	\$10.00	per fixture

Prescriptive Cooling Incentive Worksheet

2005

Equipment Type	Size Category	Qualifying Efficiency	Incentive	Eligibility/Note
Air Cooled AC Units (Split System and Single Package Units)	≤ 5 Tons	11.6 EER	\$50.00	per ton
	> 5 Tons ≤ 10 Tons	11.4 EER	\$50.00	per ton
	> 10 Tons	11.2 EER	\$25.00	per ton
Water Cooled Chillers	All Sizes	.61 kW/Ton	\$10.00	per ton
Air Cooled Chillers	< 150 Tons	1.25 kW/Ton	\$10.00	per ton
	≥ 150 Tons	1.25 kW/Ton	\$15.00	per ton
			\$200.00	per kW/Ton under 1.25 per ton
			\$200.00	per kW/Ton under 1.25 per ton

Quality Installation	≤ 10 Tons	NA	\$125.00	per ton	Size Category = Total Project Capacity
	> 10 Tons ≤ 25 Tons	NA	\$100.00	per ton	Size Category = Total Project Capacity
	> 25 Tons	NA	\$75.00	per ton	Size Category = Total Project Capacity
Diagnostic Tune Up	≤ 5 Tons	NA	\$100.00	per ton	Size Category = Total Project Capacity
	> 5 Tons ≤ 12.5 Tons	NA	\$75.00	per ton	Size Category = Total Project Capacity
	> 12.5 Tons	NA	\$50.00	per ton	Size Category = Total Project Capacity
Programmable Thermostats	NA	NA	\$50.00	per T Stat	
Cool Roofs	NA	NA	\$0.50	per Sq Ft	Both roof coatings and single membrane

Prescriptive Motor Incentive Worksheet

2005

Premium Efficiency Motors									
Horse Power	900 RPM	1050 RPM	1200 RPM	1350 RPM	1500 RPM	1800 RPM	2000 RPM	2400 RPM	Incentive/HP
1	77.6%	77.6%	85.7%	85.0%	82.2%	82.7%			\$5
1.5	85.4%	85.1%	86.9%	87.2%	86.2%	87.3%			\$5
2	86.7%	86.1%	87.5%	87.4%	87.1%	88.1%			\$5
3	86.1%	87.6%	89.8%	89.7%	89.3%	89.0%			\$5
5	88.5%	89.5%	90.4%	90.2%	90.1%	90.0%			\$5
7.5	89.7%	90.5%	91.7%	91.5%	91.5%	91.4%			\$5
10	90.4%	91.7%	92.0%	91.8%	92.0%	91.7%			\$5
15	91.0%	91.8%	93.2%	92.7%	92.7%	92.5%			\$5
20	91.8%	92.1%	93.3%	93.3%	92.9%	92.5%			\$5
25	92.9%	92.9%	94.0%	93.8%	93.7%	93.4%			\$5
30	93.3%	92.7%	94.0%	93.9%	94.0%	93.7%			\$5
40	93.6%	93.4%	94.5%	94.6%	94.5%	94.3%			\$5
50	93.7%	93.9%	94.9%	94.9%	94.6%	94.4%			\$5
60	94.3%	94.3%	95.6%	95.2%	95.1%	94.9%			\$5
75	94.4%	94.5%	95.3%	95.4%	95.3%	94.9%			\$5
100	94.6%	94.8%	95.9%	95.5%	95.5%	95.1%			\$5
125	94.7%	95.2%	95.9%	95.4%	95.7%	95.1%			\$5
150	94.8%	95.5%	96.1%	95.8%	95.9%	95.9%			\$5
> 150	95.1%	95.7%	96.2%	96.3%	96.0%	95.8%			\$5

Efficiency standards are for all motors less than or equal to the indicated horsepower (up to the lower sized motor).

For example, for a 4 HP motor, use the efficiency standard for a 5 HP motor.

Variable Speed Drives	
Horse Power	Incentive per HP
All Sizes	\$ 50.00

Prescriptive Refrigeration Incentive Worksheet

2005

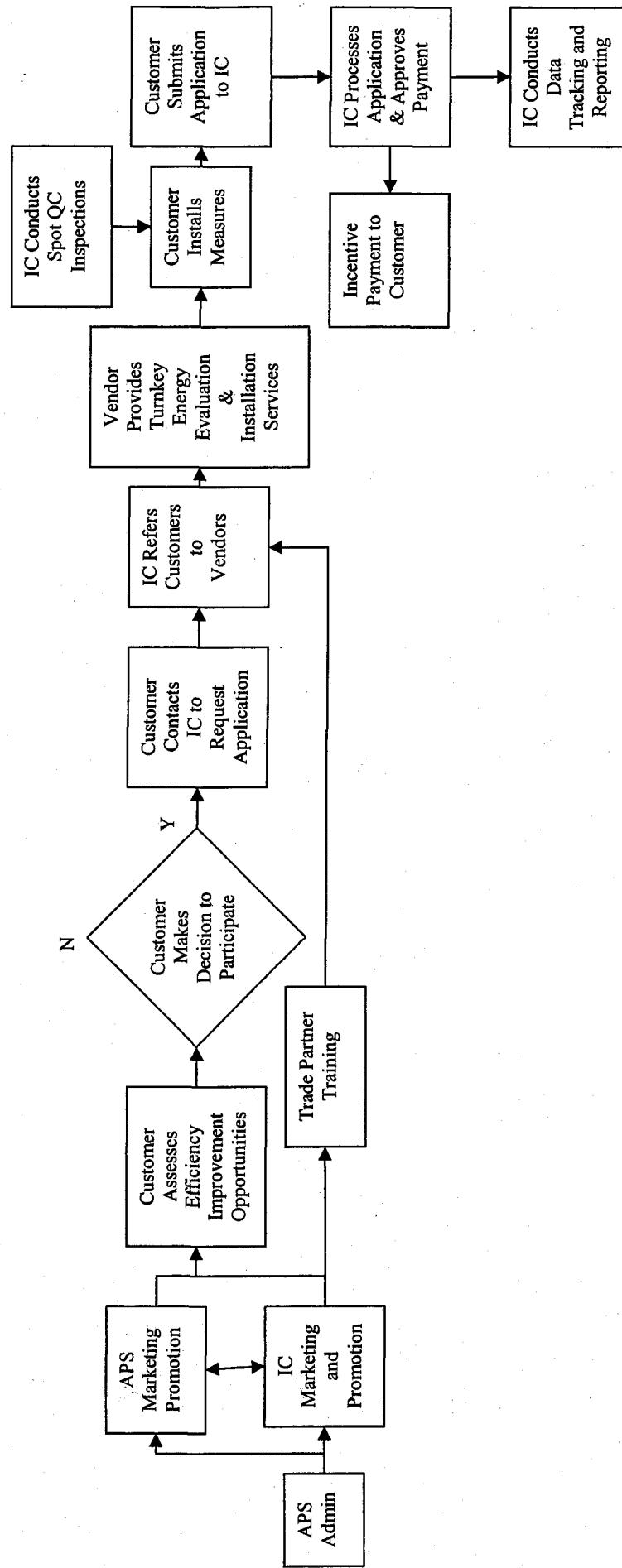
Refrigeration Measures		
Measure	Unit	Incentive/Unit
Strip Curtains on Walk-Ins	Linear Foot	\$5.00
Night Covers	Linear Foot	\$10.00
Anti-Sweat Heater Controls	Door	\$200.00
Reach in Cooler Controls	Reach in Cooler	\$100.00
High Efficiency Ice Makers*	Ice Maker	\$50.00
High Efficiency Reach-in Freezer**	Freezer	\$75.00
High Efficiency Reach-in Refrigerators**	Refrigerator	\$75.00
High Efficiency Evap Fan Motors		
PSC Motor	Motor	\$15.00
EC Motor	Motor	\$25.00
High Efficiency Vending Machines		
Beverage Case Controls	Vending Machine	\$100.00
Snack Machine Controls	Vending Machine	\$25.00

** Must meet the Federal Energy Management Program Recommended Efficiency levels of 110 lbs of ice per kWh.

** Must be Energy Star to Qualify.

Appendix 2

Small Non-Residential Program Flowchart



Small Non-Residential DSM Program

Appendix 3 – Program Budget 2005-2007

See attached Budget spreadsheets

Appendix 3: Small Non-Residential Program - Projected Budget 2005

	Small Non-Res		Planning &		Program		Rebates &		Training & Tech		Consumer	
	Total		Administration		Marketing	Implementation	Incentives		Assistance		Education	
Lighting	\$ 672,210	\$	67,221	\$	63,860	\$ 201,663	\$ 302,494	\$	23,527		13,444	
HVAC	\$ 158,449	\$	15,845	\$	15,053	\$ 47,535	\$ 71,302	\$	5,546		3,169	
Refrigeration	\$ 75,023	\$	7,502	\$	7,127	\$ 22,507	\$ 33,761	\$	2,626		1,500	
Motors	\$ 275,111	\$	27,511	\$	26,136	\$ 82,533	\$ 123,800	\$	9,629		5,502	
Total - Small Non-Residential	\$ 1,180,793	\$	118,079	\$	112,175	\$ 354,238	\$ 531,357	\$	41,328	\$	23,616	
	100.0%		10.0%		9.5%	30.0%	45.0%		3.5%		2.0%	

Note: Total DSM spending in 2005 is estimated to be \$13 million

Budget Allocation

Planning and Administration

Program Marketing

Program Implementation

Rebates & Incentives

Training & Technical Assistance
Consumer Education

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses

Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Includes all dollars that go toward customer rebates and incentives. If there is a DSM financing option, all costs related to this financing option will be supported through the DSM budget.

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants. Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3: Small Non-Residential Program - Projected Budget 2006

	Small Non-Res	Planning &	Program	Program	Rebates &	Training & Tech	Consumer
	Total	Administration	Marketing	Implementation	Incentives	Assistance	Education
Lighting	\$ 827,335	\$ 82,733	\$ 78,597	\$ 206,834	\$ 413,667	\$ 28,957	\$ 16,547
HVAC	\$ 195,015	\$ 19,501	\$ 18,526	\$ 48,754	\$ 97,507	\$ 6,826	\$ 3,900
Refrigeration	\$ 92,336	\$ 9,234	\$ 8,772	\$ 23,084	\$ 46,168	\$ 3,232	\$ 1,847
Motors	\$ 338,598	\$ 33,860	\$ 32,167	\$ 84,649	\$ 169,299	\$ 11,851	\$ 6,772
Total - Small Non-Residential	\$ 1,453,284	\$ 145,328	\$ 138,062	\$ 363,321	\$ 726,642	\$ 50,865	\$ 29,066
	100.0%	10.0%	9.5%	25.0%	50.0%	3.5%	2.0%

Note: Total DSM spending in 2006 is estimated to be \$16 million

Budget Allocation

Planning and Administration

Program Marketing

Program Implementation

Rebates & Incentives

Training & Technical Assistance
Consumer Education

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses
Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).
Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.
Includes all dollars that go toward customer rebates and incentives. If there is a DSM financing option, all costs related to this financing option will be supported through the DSM budget.
Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants. Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3: Small Non-Residential Program - Projected Budget 2007

	Small Non-Res		Planning &		Program		Program		Rebates &		Training & Tech		Consumer	
	Total		Administration		Marketing		Implementation		Incentives		Assistance		Education	
Lighting	\$	982,460	\$	98,246	\$	83,509	\$	206,317	\$	540,353	\$	34,386	\$	19,649
HVAC	\$	231,580	\$	23,158	\$	19,684	\$	48,632	\$	127,369	\$	8,105	\$	4,632
Refrigeration	\$	109,650	\$	10,965	\$	9,320	\$	23,026	\$	60,307	\$	3,838	\$	2,193
Motors	\$	402,085	\$	40,208	\$	34,177	\$	84,438	\$	221,147	\$	14,073	\$	8,042
Total - Small Non-Residential	\$	1,725,775	\$	172,577	\$	146,691	\$	362,413	\$	949,176	\$	60,402	\$	34,515
		100.0%		10.0%		8.5%		21.0%		55.0%		3.5%		2.0%

Note: Total DSM spending in 2007 is estimated to be \$19 million

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses

Program Marketing

Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives. If there is a DSM financing option, all costs related to this financing option will be supported through the DSM budget.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants. Includes dollars that are used to support general consumer education about energy efficient improvements.

Consumer Education

Small Non-Residential DSM Program

Appendix 4 – Estimated Energy Savings

See attached energy savings spreadsheet

Appendix 4: Small Non-Residential - Energy Savings Calculations

Lighting Measures:	Demand kW savings per unit	Peak Coincidence Factor	Annual Energy Savings kWh savings per unit	# unit 2005	# unit 2006	# unit 2007	TOTAL kW TOTAL			TOTAL kW Savings 05-07	Meas. life	TOTAL Lifetime kWh 05			TOTAL Lifetime kWh savings 05-07			Total Program Cost \$ Lifetime 2005-2007 kWh	Total Units 2005-2007	Notes
							05	06	07			05	06	07	05	06	07			
18 Fluorescents with Electronic Ballasts	0.031	93%	136	7,562	10,342	13,509	218.0	298.2	389.5	905.6	18	18,512,654	25,316,450	33,088,613	76,889,718	31,413				
TS Systems	0.126	93%	550	939	1,284	1,677	110.0	150.4	196.5	465.9	18	9,293,878	12,709,577	16,601,865	38,605,340	3,900				
CFLs	0.075	93%	328	5,186	7,091	9,263	361.7	494.6	646.1	1,502.4	5	8,504,413	11,629,966	15,191,843	35,328,022	21,540				
Energy Efficient LED Exit Signs	0.036	100%	308	436	596	778	15.7	21.4	28.0	65.1	20	2,683,246	3,669,398	4,793,149	11,145,791	1,809				
Install - Daylighting Controls	0.045	93%	2,818	109	149	195	65.3	89.3	116.7	271.3	15	4,603,117	6,294,861	8,222,662	19,120,640	452				
Install - Occupancy Sensors	0.044	93%	481	272	372	486	11.1	15.2	19.9	46.3	12	1,571,398	2,148,920	2,807,027	6,527,344	1,131				
Delamping	0.086	93%	377	2,178	2,978	3,891	174.2	238.2	311.2	723.8	18	14,778,632	20,211,463	26,401,223	61,392,317	9,047				
Outdoor Lighting	0.082	35%	440	3,025	4,137	5,404	86.8	118.7	155.1	360.6	18	23,957,553	32,762,465	42,795,970	98,515,988	12,565				
HVAC Measures:																				
Air-cooled AC Units (packaged cooling)	1.610	95%	3,515	82	113	147	125.8	172.1	224.8	522.7	15	4,337,761	5,932,009	7,748,687	18,018,477	342	assumes 5 ton unit			
Install EE Air-cooled Chillers	12,000	70%	28,250	2	2	3	15.0	20.5	26.7	62.2	20	935,842	1,278,784	1,671,718	3,887,343	7	assumes 75 ton unit			
Install EE Water-cooled Chillers	15,000	70%	32,700	3	4	5	28.9	41.0	53.5	124.4	20	1,965,267	2,560,782	3,331,972	7,748,030	12	assumes 150 ton unit			
HVAC Diagnostics and Tune-up	0.560	95%	1,525	13	18	23	6.8	9.3	12.2	28.4	15	293,587	401,468	524,442	1,219,515	53	assumes 5 ton unit			
HVAC Quality Installation	0.840	95%	2,285	10	14	18	8.2	11.2	14.6	34.0	15	351,919	481,257	628,642	1,461,819	43	assumes 5 ton unit			
Refrigeration Measures:																				
High-efficiency Refrigerators	0.157	87%	826	122	166	217	16.6	22.7	29.7	69.0	15	1,505,855	2,059,288	2,689,946	6,255,089	505				
High-efficiency Freezers	0.193	87%	1,718	122	166	217	20.4	27.9	36.5	84.8	15	3,132,032	4,283,121	5,594,826	13,009,979	505				
High-efficiency Ice Makers	0.113	87%	592	30	42	54	3.0	4.1	5.3	12.4	12	215,851	296,161	385,581	896,613	126				
High-efficiency Evaporative Fan Motors	0.048	87%	324	69	94	123	2.9	3.9	5.2	12.0	15	335,610	458,964	599,509	1,394,074	287				
Reach-in Cooler Controls	0.114	87%	1,200	15	21	27	1.5	2.1	2.7	6.3	12	218,768	298,170	390,781	908,730	63				
Beverage Case Controls	0.153	87%	1,610	15	21	27	2.0	2.8	3.6	8.4	12	293,514	401,367	524,311	1,219,212	63				
Snack Machine Controls	0.031	87%	322	61	83	109	1.8	2.2	2.9	6.8	12	234,611	321,109	419,489	975,370	252				
Anti-sweat Heater Controls	0.697	87%	3,644	8	10	14	4.6	6.3	8.2	19.1	12	332,163	454,240	593,351	1,379,754	32				
Strip Curtains	0.029	87%	502	304	416	543	7.7	10.5	13.7	31.8	4	610,120	834,353	1,089,873	2,534,346	1,282	unit = per linear ft.			
Night Covers	-	87%	404	152	208	271	0.0	0.0	0.0	0.0	4	245,507	335,735	438,554	1,019,797	631	unit = per linear ft.			
Motor Measures:																				
Energy Efficient ODP or TEFC Motors	0.085	95%	345	2,228	3,047	3,981	137.6	188.2	245.8	571.6	15	11,531,955	15,770,195	20,599,817	47,901,968	9,256				
less than 10 HP	0.450	95%	2,500	134	183	239	57.2	78.2	102.1	237.4	15	5,013,894	6,856,607	8,956,442	20,826,843	555	5 HP example			
greater than 10 HP & less than 100 HP	1.050	95%	5,400	7	10	13	7.4	10.1	13.2	30.8	15	601,667	822,793	1,074,773	2,499,233	31	50 HP example			
greater than 100 HP																	150 HP example			
Install - Variable Speed Drive	0.328	95%	13,995	67	91	119	20.8	28.5	37.2	86.5	15	14,033,888	19,191,642	25,069,082	58,294,612	278	5 HP example			
Total Small Non-Residential Program													539,983,062	\$	4,359,852	\$0.0081	96,161			

Where:
Column A = DSM measure
Column B = kW savings
Column C = Peak coincidence - APS and Summit Blue Consulting analysis
Column D = kWh savings/unit
Columns E-G = APS estimates of # units each year. All estimates will be updated with results from the APS market potential study.
Columns H-K = total kW demand savings estimate
Column L = Measure life for each end use technology
Columns M-P = Estimated lifetime kWh energy savings over the expected life of the measures.

Attachment 9

Building Operator Training

Building Operator Training Program

Program Concept and Description

- Provides subsidized training for building operators (managers) and facility maintenance technicians on energy-efficient building operating and maintenance practices.
- Program training will be provided through a cooperative effort with the Electric League of Arizona ("ELA") in support of their "Institute for Facility Management Education" program, which includes industry expert training targeted to reach facility managers and building operators of medium to large commercial and industrial facilities. The Institute was developed in summer of 2003 by APS in conjunction with the ELA. Founded in 1960, the ELA is a state-wide, non-profit trade association supporting the electrical, HVACR ("heating, ventilation, air conditioning and refrigeration") and energy management industries through education, publications, consumer referral services and utility trade ally programs.
- The ELA issues a certificate of completion for participants that successfully complete Facility Maintenance Technician training and Building Operator training.

Program Eligibility

- All commercial, industrial and institutional building operators and maintenance technicians located in APS' service territory are eligible for the Building Operator Training ("BOT") program.

Target Market and Current Baseline Conditions

- This program is designed to help building operators and facility maintenance personnel better understand how their facilities use energy, and how to better manage energy costs. They will learn how to gain efficiency from purchasing energy-efficient equipment, operating it correctly, and keeping it well maintained.
- The ELA Institute for Facility Management offers educational programs that are designed for a wide range of facility management personnel, including building operators, maintenance technicians, and managers of complex multi-facility organizations.
- Program curricula were developed by industry practitioners, APS staff members, and lead instructors and education committee members of the ELA and Arizona Heat Pump Council ("AHPC"). Instructors at the Institute for Facility Management Education include professional building energy managers of large facilities and trainers with an average of over 25 years experience. In addition, guest instructors include energy management contractors and members of the Arizona Department of Commerce Energy Office who specialize in facility auditing and working with facility managers to reduce energy cost.

Program Rationale

- Increase the knowledge of building operators and facility maintenance technicians about utilizing energy-efficient mechanical and electrical systems operation and maintenance in their facilities.

Program Objectives

- Promote operation and maintenance practices that increase the energy-efficiency of commercial and industrial facilities.
- Help participants understand and implement the following concepts:
 - General utility rate concepts, like how they are billed for energy and demand, and how managing or reducing their energy consumption through energy-efficiency measures and operational practices can reduce their energy expenses.
 - Institute a preventative maintenance program in their facility, which includes written maintenance logs that must be completed periodically. Include checks for efficient equipment operation (i.e., economizer/dampers for leaks, coil cleaning, air filter cleaning, system balancing, controls, etc.).
 - Learn how to perform an energy audit of their facility and identify savings opportunities, including how to use the Department of Energy's motors and compressed air system software to evaluate savings potential from improved systems.
 - Learn to create reports for management that justify energy-efficiency capital expenses intended to produce O&M savings.
 - Improve purchasing requirements by knowing what to look for when repairing or replacing equipment, and how to calculate the payback of energy savings associated with purchase options; and
- Provide a mechanism for channeling participation to other APS DSM programs.

Building Operator Training Program

Products and Services Provided

- The following courses will be offered at least twice per year, possibly more, given the interest level. Each course is eight weeks long and eight hours per week:
 - Building operator training on energy-efficient building operation and maintenance practices including: HVAC, lighting, electrical systems, and energy conservation;
 - Facility maintenance technician training on building operating and maintenance practices including: HVAC & airflow control, refrigeration, electrical systems and variable frequency drives ("VFD"); and
 - Student materials include comprehensive HVACR and electrical texts, and additional resources which include Arizona Industries of the Future, Inc. CD software, course handouts, APS energy-efficiency fact sheets, website links and information on supplemental training seminars.
- Incentives covering up to 50% of the participant cost of training for Facility Maintenance Technician Training (full cost equals \$895) and the Building Operator Training (full cost equals \$1195). Incentive levels and other program elements will be reviewed and adjusted as needed during the first year from the approval date of this program, and annually thereafter, with ACC Staff review; and
- Information about other APS DSM programs for which participating companies might be eligible.
- Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.

Delivery Strategy and Administration

- APS provides program administration and the Electric League provides the training.
- Trainers and curricula will be provided by industry experts from trade partners including Electric League trainers.
- Appendix 1 provides a basic flow chart that outlines the anticipated program delivery mechanism.

Marketing and Communications

- APS provides marketing including printed promotional materials, brochures and website content. APS will utilize newsletters and customer communications to promote the Building Operator Training Program.
- The ELA also provides program promotion to industry contacts through a database mailing list, HVACR Today, and Electric Times, which are industry newspapers, and through industry trade show participation.
- The ELA handles all program implementation issues including course scheduling, registration, payment and administration.

Program Implementation Schedule

- The following table shows the estimated timeline for key program activities by quarter.

Program Activity	Timeline											
	2005				2006				2007			
Collaborative Meetings & Program Buy-in												
Program Pre-approval Filed with ACC												
Program Approval by ACC												
Develop Marketing Materials & Promote Class												
Classes Offered												
Continue to Develop Curriculum												
Obtain Participant Feedback and Evaluation												
Verify EE Opportunities Identified from Training												
Identify EE Actions Taken from Training												

Monitoring and Evaluation Plan

- The strategy for monitoring and evaluation will involve integrated evaluation. In this approach, data are collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data at a lower cost.

Building Operator Training Program

- The evaluation strategy for the program will involve surveys at the completion of the training to assess participant intentions of ideas for implementing techniques learned through the training, and follow-up surveys to identify actual actions taken. Program tracking systems will also track channeling of participants to other DSM programs.
-

Building Operator Training Program

Program Budget

- The BOT Program budget for program year 2005 is \$65,000; \$80,000 in 2006; and \$95,000 in 2007, which includes planning & administration, implementation, incentives, consumer education, training & technical assistance, and marketing. See Appendix 2 for more information about the program budget.

Estimated Energy Savings

The BOT total program cost per lifetime kWh is \$0.0033, which equals \$240,000 total program costs / 73,703,500 lifetime kWh. See Appendix 3 for more detailed information on savings estimates.

The following Table shows the estimated energy savings for the BOT program:

Year	Annual Peak kW Demand Savings	Lifetime kWh Savings*
2005	172	19,961,400
2006	212	24,567,800
2007	251	29,174,300
Program Total 2005-2007	635	73,703,500

* Lifetime kWh savings refers to total energy savings over the expected life of the DSM measure.

Program Cost Effectiveness

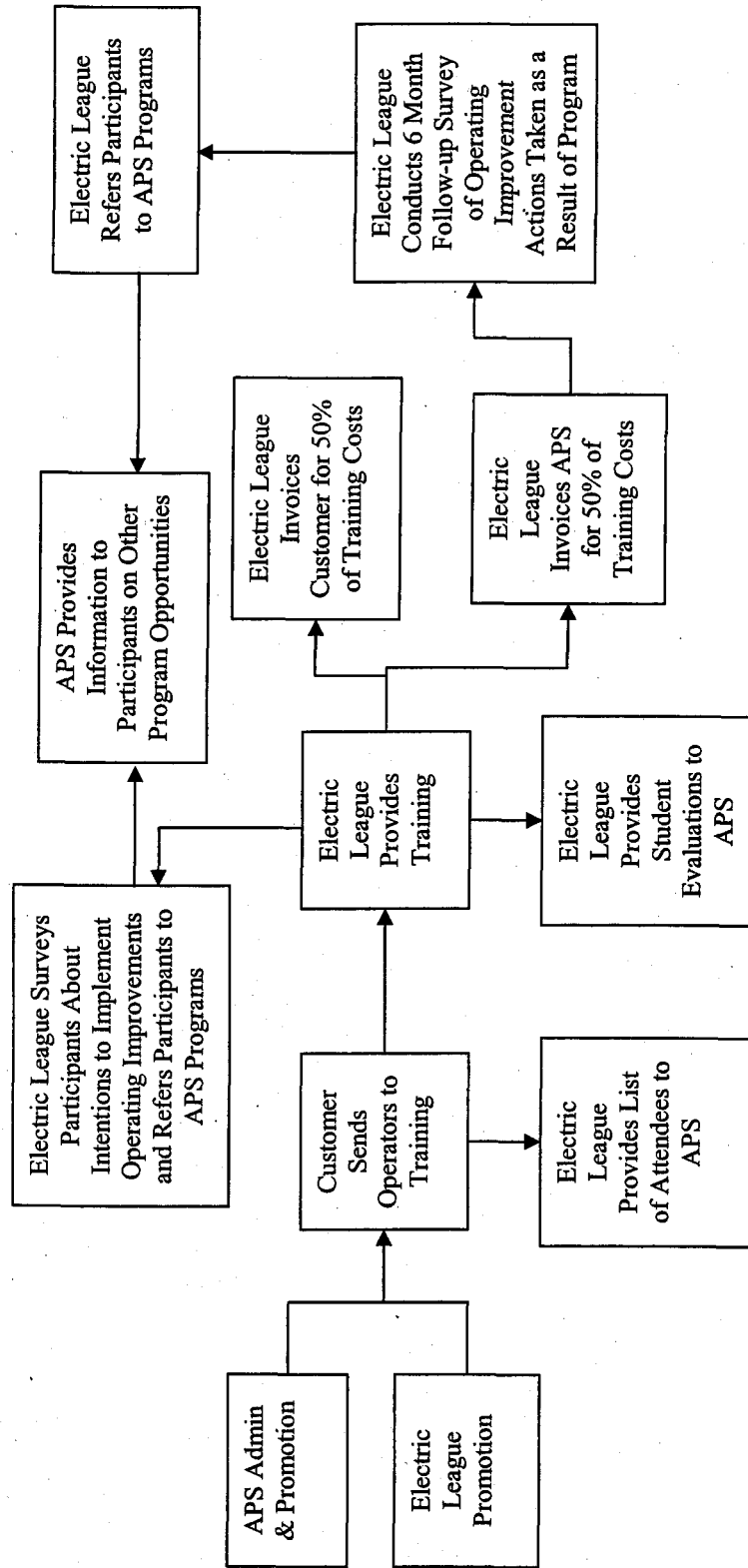
The BOT program is effective with a Societal Cost Test benefit/cost ratio of 3.20.

Total APS Program Cost 2005-2007	\$/Lifetime kWh	Societal Cost Test Total Benefits	Societal Cost Test Total Costs	Societal Cost Test Benefit/Cost Ratio
\$240,000	\$0.0033	\$2,762,386	\$864,000	3.20

In addition to the savings shown above, it is estimated that the program will produce these environmental benefits over the life of the measures:

Water Savings	17,172,916 gal.
SOx	317 lbs.
NOx	12,677 lbs.
CO2	67,586,110 lbs.
PM10	1,747 lbs.

Building Operator Training Flowchart



Appendix 2 – Program Budget 2005-2007

See attached Budget spreadsheet

Appendix 2: Building Operator Training Program - Projected Budget 2005 - 2007

	Planning &			Program		Rebates &	Training & Tech		Consumer
	BOT Total	Administration	Marketing	Implementation	Incentives		Assistance	Education	
BOT 2005	\$ 65,000	\$ 3,250	\$ 2,438	\$ 5,688	\$ -	\$ -	\$ 52,000	\$ 1,625	
BOT 2006	\$ 80,000	\$ 4,000	\$ 3,000	\$ 7,000	\$ -	\$ -	\$ 64,000	\$ 2,000	
BOT 2007	\$ 95,000	\$ 4,750	\$ 3,563	\$ 8,313	\$ -	\$ -	\$ 76,000	\$ 2,375	
	\$ 240,000	\$ 12,000	\$ 9,000	\$ 21,000	\$ -	\$ -	\$ 192,000	\$ 6,000	

Note: training & technical assistance is considered the incentive amount in this program, as it provides a direct benefit to the customer.

BOT budget amounts determined based on a \$13 million total DSM budget in 2005, \$16 million total DSM budget in 2006, and \$19 million total DSM budget in 2007

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses

Program Marketing

Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Appendix 3 – Estimated Energy Savings

Estimated Savings:

Estimated kWh savings per s.f.	0.14	Market Progress Evaluation Report – BOC No. 7
Average s.f. per facility	47,984	1996 EUDAP adjusted to estimated 2005 levels
Estimated Annual Participants	244	Assumes average of 2 facilities are operated by each of 122 participants
Total s.f. participation per year	11,708,096	
Estimated Annual kWh Savings	1,637,856	
Estimated kWh Savings per Participant	6,718	
Estimated kW Savings per Participant	0.87	At 56.9% LF from EUDAP information with a .92 coincidence factor and .70 demand diversity factor
Estimated Annual kW Savings	212	

Note: the estimated annual savings is calculated for an \$80,000 BOT budget amount, based on a total 2006 DSM budget of \$16,000,000.

Estimated Savings for 2005 – 2006:

	2005	2006	2007
Annual kW	172	212	251
Annual kWh	1,330,758	1,637,856	1,944,953
Lifetime kWh	19,961,365	24,567,833	29,174,302

Note: The 2005 budget and estimated savings amount is prorated to the \$13M overall DSM spending level (\$65K for BOT program) and 2007 total DSM spending is estimated at \$19M (\$95K for BOT program).

The kWh savings estimate related to the BOT program equals 0.14 kWh per square foot. This savings estimate was adopted from pages 93 through 95 of the Market Progress Evaluation Report – Regional Building Operator Certification (BOC) No. 7, September 2001. It was identified that BOC-trained building operators more frequently engage in the energy-efficiency actions explored than do non-trained building operators. Furthermore, the report indicates that the estimate of .14 kWh per square foot provides the minimum floor for actual program savings due to four factors:

- Most significantly, the estimate is based on only five of the many energy savings techniques taught in the BOC course series.
- Comments from a number of students indicated that the training influenced them and their organizations to make a greater investment in efficient lighting than they would otherwise have made.
- The five measured activities are applicable to students working as building operators, while the BOC also trains managers and advisors who may have significant influence of the facility operations and efficiency decisions.
- A downward bias resulted from a difference in the proportion of trained vs. non-trained staff conducting each efficiency measure.

The Northwest Energy Efficiency Alliance used a planning estimate of 0.5 kWh savings per square foot for its cost effectiveness and savings analysis based on follow-up surveys with prior students. Therefore, a higher estimated kWh savings for APS' BOT program might be justified, but we have utilized the more conservative estimate of 0.14 kWh per s.f. for planning purposes.

Attachment 10

Energy Information Services

Energy Information Services Program

Program Concept and Description

- Provide monthly energy use information to large non-residential customers through an automated service maintained by a third party energy management information systems provider.
- Provide an energy information service at a reduced fee to large commercial, industrial and institutional customers. The maximum Energy Information Service ("EIS") incentive payout is limited to \$1000 per customer.
- At a minimum, the customer will receive monthly usage and demand reports that could be utilized to improve or monitor energy usage patterns, reduce energy use, reduce demands during on-peak periods and better manage their overall energy operations.

Target Market and Current Baseline Conditions

- Any APS customer with a single metered site that has a monthly billed demand of greater than 200 kW in the past twelve months, and a need for energy information services will be considered for this program.
- Baseline conditions for this product in APS' service territory are unknown at this time. APS will incorporate EIS baseline product information as it is determined in our baseline study to be conducted by the end of 2005.

Program Eligibility

- Large non-residential customers with a single metered site that has a monthly billed demand of greater than 200 kW in the past twelve months of billing history.

Program Rationale

- Educate facility managers and operators about how and when energy is used at their facilities so that energy-efficiency improvements can be made.
- Providing education to facility managers and operators about energy-efficiency improvements should allow APS to channel participation to our other Demand Side Management ("DSM") programs.

Program Objectives

- Provide monthly energy usage information to large non-residential customers:
 - Identify strategies to lower energy cost by reducing energy usage and demand;
 - Educate EIS program participants about utility rate concepts, like how they are billed for energy and demand, and how managing or reducing their energy consumption through energy-efficiency measures and operational practices can reduce their energy expenses.
 - Teach participants how to download billing history information and create spreadsheets to chart and graph their energy use, as well as identify consumption trends and savings opportunities.
 - Educate EIS participants about creating reports for management that justify energy-efficient capital expenses intended to produce operations and maintenance ("O&M") savings; and
 - Facilitate analysis of what-if scenarios to help large facility managers assess the benefits of capital improvements or operating adjustments to improve energy-efficiency.

Products and Services Provided

- A web-based energy information tool that provides real time (or near real time) feedback on customer energy consumption and load profiles.
- Advanced metering technology that transmits interval load data to a central data collection point over phone lines. This information is posted to a secured website that customers access via a password.
- A web-based user interface that provides energy managers with a wealth of tools to graphically analyze consumption/demand and benchmark against weather data, compare multiple facility sites that they manage and other factors. This analytical tool should allow flexibility to compare with historical data or assess future potential load scenarios.
- Incentive levels and other program elements will be reviewed and modified as needed during the first year from the approval date of this program, and periodically thereafter. Such modifications will be reported in the mid-year and year-end reports submitted to Staff.
- The implementation contractor ("IC") will provide basic training and/or technical assistance to the customer in an effort to optimize the energy-efficiency benefits of the equipment installed.

Energy Information Services Program

Delivery Strategy and Administration

- APS provides overall program administration.
- APS issues request for proposal ("RFP") and selects energy management information systems provider as implementation contractor.
- Energy information systems are provided and maintained by the selected third party vendor.

Marketing and Communications

- APS promotes EIS with targeted customers.
- The EIS vendor also provides program promotion.
- APS provides marketing, including printed promotional materials, brochures, and website content.

Program Implementation Schedule

- The following table shows the estimated timeline for key program activities by quarter.

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Collaborative Meetings & Program Buy-in												
Program Pre-approval Filed with ACC												
Issue RFP for EIS Vendor												
Program Approval by ACC												
Review and Select EIS Vendor												
Begin Program Implementation and Promotion												
Continuous Program Implementation												
Process Evaluation (on going)												
Program Redesign (as needed)												
Savings Verification												

* Selection of the EIS vendor, as a result of the RFP process, will be completed after ACC approval of the program, and the timeline will be adjusted accordingly.

Monitoring and Evaluation Plan

- The strategy for monitoring and evaluation will involve integrated evaluation. In this approach, data are collected directly at the time of implementation rather than after the fact. The result is more timely and accurate data at a lower cost.
- EIS can be used by facility managers to help them track before/after consumption and demand patterns to help analyze the impact of facility energy-efficiency improvements. This data can be accessed by APS for evaluation purposes.

Program Budget

- The EIS Program budget for program year 2005 is \$81,250; \$100,000 in 2006; and \$118,750 in 2007, which includes planning & administration, implementation, incentives, consumer education, training & technical assistance, and marketing. See Appendix 1 for more information about the program budget.

Estimated Energy Savings

APS does not have solid EIS baseline information from which to measure, and has adopted the conservative 0.14 kWh per square foot savings estimate from the Building Operator Training program as a proxy. Baseline information will be updated upon completion of APS' baseline study due by the end of 2005. The total program cost per lifetime kWh is \$0.0074, which equals \$300,000 total program cost / 40,562,200 lifetime kWh. See Appendix 2 for more detailed information on savings estimates.

Energy Information Services Program

The following Table shows the estimated savings for the EIS program:

2005	91	10,985,600
2006	113	13,520,700
2007	134	16,055,900
Program Total 2005-2007	338	40,562,200

* Lifetime kWh savings refers to total energy savings over the expected life of the DSM measure.

Program Cost Effectiveness

The EIS program appears to be effective with a Societal Cost Test benefit/cost ratio of 4.27, given the estimated energy savings as noted above.

\$300,000	\$0.0074	\$1,513,253	\$354,000	4.27
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In addition to the savings shown above, it is estimated that the program will produce these environmental benefits over the life of the measures:

Water Savings	9,450,984 gal.
SOx	174 lbs.
NOx	6,977 lbs.
CO2	37,195,503 lbs.
PM10	961 lbs.

Energy Information Services Program

Appendix 1 – Program Budget 2005-2007

See attached Budget spreadsheet

Appendix 1: Energy Information Services Program - Projected Budget 2005 - 2007

	Planning &		Program		Rebates &		Training & Tech		Consumer	
	Administration		Marketing		Incentives		Assistance		Education	
EIS 2005	\$ 81,250	\$ 3,250	\$ 2,031	\$ 6,500	\$ 65,000	\$ 2,844	\$ 1,625			
EIS 2006	\$ 100,000	\$ 4,000	\$ 2,500	\$ 8,000	\$ 80,000	\$ 3,500	\$ 2,000			
EIS 2007	\$ 118,750	\$ 4,750	\$ 2,969	\$ 9,500	\$ 95,000	\$ 4,156	\$ 2,375			
	\$ 300,000	\$ 12,000	\$ 7,500	\$ 24,000	\$ 240,000	\$ 10,500	\$ 6,000			

EIS budget amounts determined based on a \$13 million total DSM budget in 2005, \$16 million total DSM budget in 2006, and \$19 million total DSM budget in 2007

Budget Allocation

Planning and Administration

Refers to APS costs to plan and administer programs - includes management of program budgets, oversight of implementation contractor, program development, program coordination and general overhead expenses
Includes all expenses related to marketing the program and increasing DSM consumer awareness (this refers to direct program marketing costs as opposed to general consumer education).

Program Marketing

Program Implementation

Refers to program delivery costs associated with implementing the program. Includes implementation contractor labor and overhead costs as well as other direct program delivery costs.

Rebates & Incentives

Includes all dollars that go toward customer rebates and incentives.

Training & Technical Assistance

Includes all dollars that are used for energy efficiency training and technical assistance for Non-Residential program participants.

Consumer Education

Includes dollars that are used to support general consumer education about energy efficient improvements.

Energy Information Services Program

Appendix 2 – Estimated Energy Savings

Estimated Savings:

Estimated kWh savings per s.f.	0.14	Market Progress Evaluation Report – BOC No. 7
Average s.f. per facility	80,480	1996 EUDAP – adjusted to estimated 2005 levels
Estimated Annual Participants	80	
Total s.f. participation per year	6,438,400	
Estimated Annual kWh Savings	901,381	
Estimated kWh Savings per Participant	11,267	
Estimated kW Savings per Participant	1.41	At 56.9% LF from EUDAP information with a .92 coincidence factor and .70 demand diversity factor
Estimated Annual kW Savings	113	

Note: the estimated annual energy savings is calculated for a \$100,000 annual EIS budget, based on a total 2006 DSM budget of \$16,000,000. As stated previously, APS does not have solid EIS baseline information from which to measure, and has adopted the conservative 0.14 kWh per square foot savings estimate from the Building Operator Training program as a proxy.

Estimated Savings for 2005 – 2006:

	2005	2006	2007
Annual kW	91	113	134
Annual kWh	732,372	901,381	1,070,390
Lifetime kWh	10,985,586	13,520,721	16,055,856

Note: The 2005 budget and estimated savings amount is prorated to the \$13M overall DSM spending level (\$81,250 for EIS program) and 2007 total DSM spending is estimated at \$19M (\$118,750 for EIS program).